Bob Cooper's

FEBRUARY 15 2005

SatFACTS

MONTHLY

Reporting on "The World" of satellite television in the Pacific and Asia

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TALE of two LARGE junker dishes

Solar Storm: How I804 was zapped

Microwave Amplifiers Explained

✓ Latest Programmer News
✓ Latest Hardware News
✓ Fiji TV Now Nagravision
✓ Observer Reports

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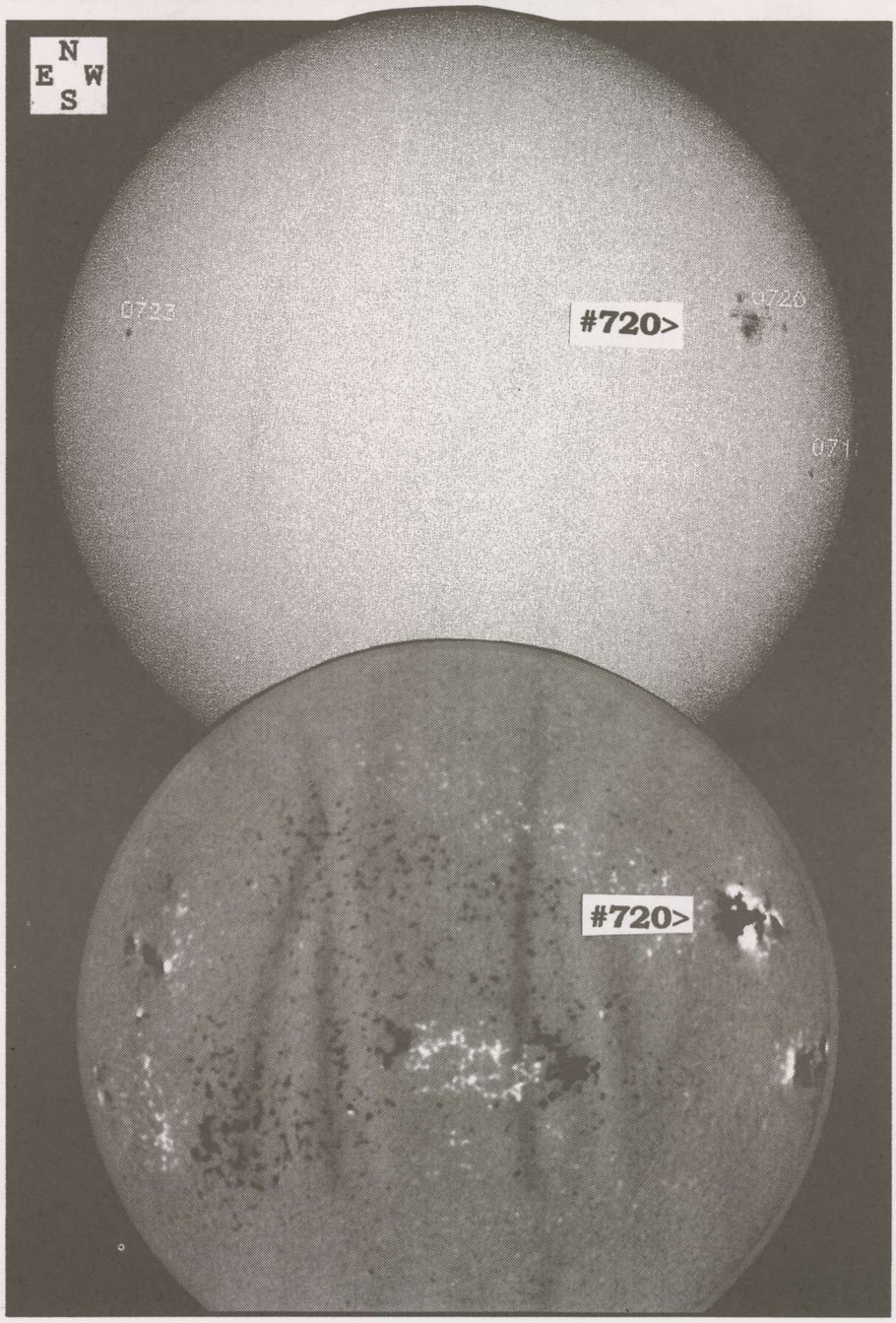

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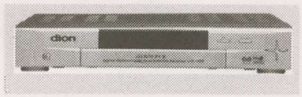
Specials this month

DT800PVR - Digital Receiver



- 40Gb HDD = 40hr Record time
- 2x CI CAM Slots
- DiSEqC 1.2
- **Fibre Optic Output Capability**

Price: $390 AUD + GST

Satlook - Signal Meter

- Digital, Analogue and combined versions available
- A must for the professional
- Simple menus and functions

Price: Phone up for Quote

DreamMAX - DT470

- Irdeto embedded
- 4900 Channel Memory
- DiSEqC 1.2
- User Friendly

Price: $200 AUD + GST

Everything? Yeah we got

LNBF
- Zinwell C Band
- Zinwell KU Band
- MTI C Band, Superhigh gain
- One Cable Solution - CBand
- Dual Output KU 11300 MHz

Positioners
- Superjack EZ-2000
- Superjack DP-6600, DiSEqC 1.0/1.2
- Technosat DP-200, DiSEqC 1.2
- Manual Actuator Driver - EW101
- SAP 2000: 99 Memory positioner

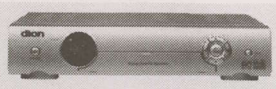
Actuators
- Superjack HARL-3618, 18" Actuator
- Superjack HARL-3624, 24" Actuator
- Superjack DG-120, H/H Mount

Receivers
- SuperNET CA, Irdeto Embedded
- Success, Free-to-Air
- Dion DT-370, Free-to-Air Receiver
- Dion 2x CI, Hardware AllCAMed
- ChangHong, Mediaguard embedded
- SuperNET Terrestrial, DVB-T
- Phoenix High Definition STB

Dish and mounts
- 1.2, 1.8m Solid Prime focus
- 45, 60, 65, 85cm KU dish Offset
- **2.13m, 2.27m, 2.4m, 3.0m, 3.07m, 3.7m, Mesh Dish, Light and Heavy Duty PSI and JOYSAT Avaiable**

- CBand Wall brackets
- CBand Concrete mounts and stands
- KU Gutter mounts
- KU Wall mounts
- KU Float mounts
- KU Tinroof mount

Dion 818 CI - Digital Satellite Receiver

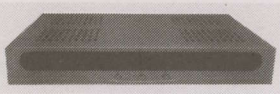


- Slim Size and User Friendly OSD
- 2x CI (Common Interface) slots
- Hardware AllCAMed

SuperJack H-H Actuator, DiSEqC embedded

- All it takes is one coaxial cable.... NO MOTOR CABLE REQUIRED
- DiSEqC Positioner EMBEDDED!

Supernet - Terrestrial DVB-T



- Digital Terrestrial Receiver
- Slim Design
- High Quality Picture
- Easy to install and use

Dion316 - Digital Satellite Receiver

- FTA + Software Patched
- 4000 Channel Memory
- DiSEqC 1.0/1.2 Compatible

Price: $170AUD + GST

Switches and Splitters
- 2 and 4 way DiSEqC switches
- 0/22kHz switchs
- 2 and 4 way cable splitters
- V/H Multiswitch
- 0/12V Switch

Cable - 15m, 25m, 305m packs
- RG6-U Dual Shield Coaxial Cable
- RG6-U Quad Shield Coaxial Cable
- Cat5 Actuator Cable

Plugs
- F Connectors, Screw or Clamp types
- Cable joiners
- AV Splitters
- Cable Strippers
- Cable clampers
- Various other joiners and accessories e.g. RCA/SCART cables and converters

Misc
- 2.4gHz AV Sender
- Irdeto 2.06B CAMs, Viaccess CAMs
- Satlook Digital Signal Meter
- Satlook Analogue Signal Meter
- Satlook Digital + Analogue combo
- Satellite finders
- Angle level measure instrument
- High Quality Compasses

SatFACTS MONTHLY

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is published 12 times each year (on or about the 15th of each month) by Far North Cablevision, Ltd. This publication is dedicated to the premise that as we enter the 21st century, ancient 20th century notions concerning borders and boundaries no longer define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of these messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

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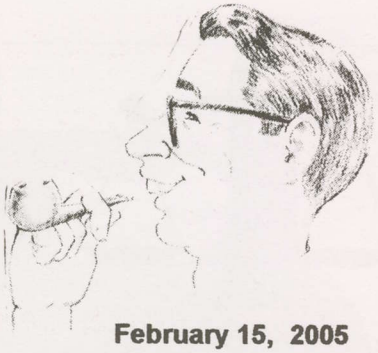
our ELEVENTH year!

COOP'S COMMENT



February 15, 2005

A trade show. There was a period, when I was younger and had more energy, that "we" (that was originally Selwyn Cathcart and I, later Gay and I) either as SatFACTS or as the now sleeping trade association "SPACE Pacific," attempted to do one annual show, either in New Zealand or in Australia. The last show was in September 2001, Melbourne; it was a financial and logistics disaster because of 9/11 in the USA and realising that approaching 65 (at the time) I had no good reason to put myself through that kind of stress, I vowed to Gay we would never do it again. We stand by that.

But Brian Watson, who operates one of Australia's stellar satellite TV businesses out of Launceston, Tasmania has a different plan; a satellite trade show in March 2006 (that is NEXT year); see announcement on p. 13, here. The Coopers have never been to Tasmania although we realise that at one point around 60 million years ago Tasmania, Australia and New Zealand were directly connected to one another. It is unlikely the species of that era held trade shows.

Getting together, a "meeting of the clan" as it were, is always a positive concept. And Watson with 12 months to create a worthwhile agenda, and iron out travel and lodging wrinkles, has the support of the Tasmanian Tourism Board so it should work out OK. We encourage you to turn to p. 13 here, read the dates, and then tell your "other half" that you plan to attend - even if you are reading this in PNG or American Samoa (www.conferenceplus.com.au/satellite2006).

SatFACTS has written about WiFi over the past several years, pointing out that someone with a portable computer can take their home satellite or terrestrial TV with them wherever they go, essentially world-wide, these days (TV2Me). A WiFi system installed in a public area (such as an airport waiting lounge or a tourism area in Sydney) is a license-free collector of money. Just build the 2.4 GHz system, and wait for folks to "check in" with their portables. But being unlicensed begs competition - which is exactly what is happening now world-wide. "Evil Twin" WiFi systems have appeared at hundreds of locations - they capture your "portable PC log-on" message, you think you are dealing with WiFi firm "A" when in fact you are actually dealing with "B". It gets much worse. "B" is a shady group bent on capturing (as you use them) your confidential credit card and other information, which once grabbed out of the air they exploit for private gain. It is the latest area of "cybercrime" and by mimicking a "legitimate base station" these folks are cloning real WiFi systems. You have been warned.

Late comers. The New Zealand government has now accepted an application from Kiwi Company NZLSAT which seeks approval for a plan to build, launch and operate a C + Ku + perhaps Ka band satellite at 158E; that is half way between Optus B1 and Optus C1. The proposed satellite has grown from US$125 million to US$165 million and chances are it will go higher - much higher - before it actually happens. If it happens. Backers of NZLSAT point at the loss of I804 as proof that greater satellite capacity, for New Zealand and the Pacific, is necessary. Hopefully when it is built, there will be no tin-plated relays on board (p. 8). New Zealand had been very slow off the mark to claim their rightful spot or spots in the geostationary orbit belt, and perhaps 158E is not the best location for a Ku band inclusive satellite. But, it is what remains after faster countries with more advanced technology (such as Tonga!) have already claimed their geostationary Clarke Orbit locations. Better late than never? Time will tell.

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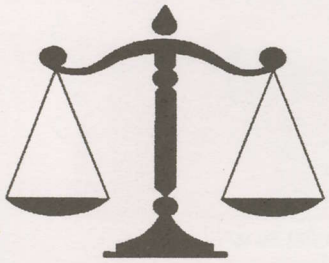
-On the cover-

Sunspot # 720. Bigger (much bigger!!!) than planet earth, spewing out zillions of volts of electrically charged energy some of which found its way to Intelsat I804 in mid-January. Score: Sunspot 1; satellite 0. And it's not over yet - 720 will be back just days before you read this report (p. 8).



LETTERS

Polar mount install help?

"Can you help with DVD or VHS tape of Pietro Coasar's SatFACTS presentation explaining the proper procedure for setting up a polar mount C-band dish? An aside - it seems many installers are running into problems making digital terrestrial work properly and here in the Melbourne area one of the chain-franchise operated installer firms apparently has only a single spectrum analyser to be shared amongst a number of installers. Worse yet, no training on how to use it or what the numbers mean!"

Rick Dalton, Melbourne

On pages 31 & 32 this issue we announce immediate availability of either a CD-DVD or CD format ten-year collection of SatFACTS which does include Pietro's epoch "How to install a polar mount dish" report. The 15 Space Pacific one-hour TV shows are gradually being processed for a separate DVD set which should be available mid-year; again, including Pietro's TV report. As for not enough meters and not enough knowledge, SatFACTS October and November 2004 just completed a two parter describing exactly how to use a suitable spectrum analyser meter . Those who complain they "don't know how to use it" are perhaps too lazy to sit down and read the readily available information. People who won't make an effort to advance their knowledge base should find another line of work. We have yet to meet the first person who 'popped out of the womb' embedded with the knowledge to run a spectrum analyser!

Winnie as a pirate?

"I do not see how Churchill's directive that the BBC TV transmitter be modified to 'fool' German bombers into thinking they were homing in on Crystal Palace makes him a 'TV pirate' (SF#125, p. 1)."

Al, NSW

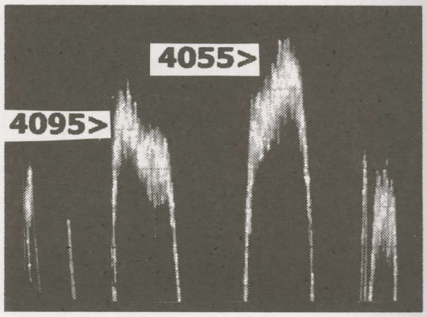
When the Germans over ran France, they chose to leave operating the French Eiffel Tower TV transmitter. A monster 160 element antenna array constructed at Churchill's directive allowed Allied intelligence officers to view and benefit from the material intended for German troop benefit; read the book!

PROGRAMMER PROGRAMMING PROMOTION

UPDATE

FEBRUARY 15, 2005

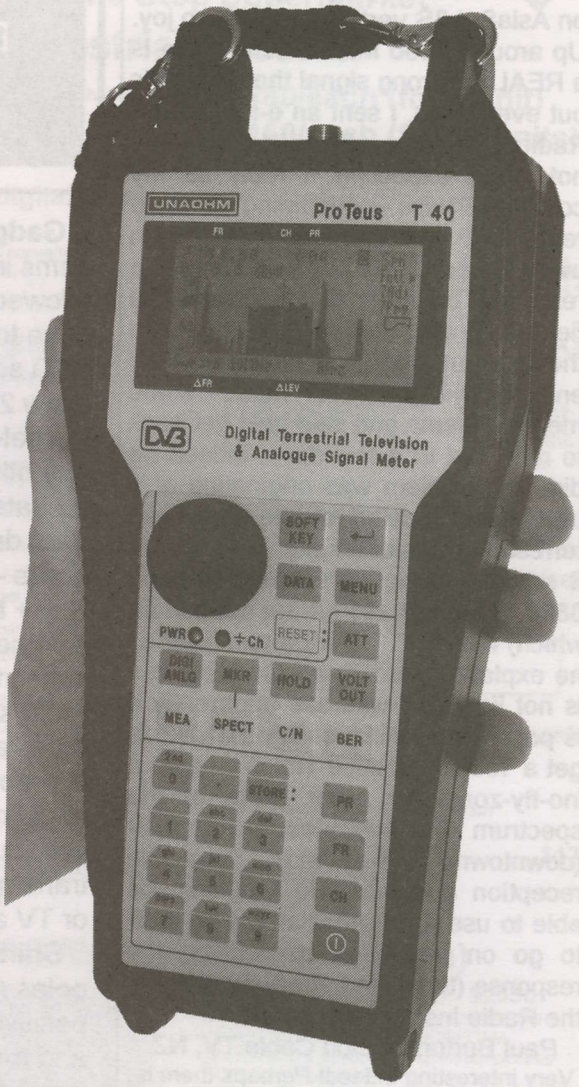
Fiji's levels. Field reports indicate Fiji's 4095 transponder is over 1 dB *hotter* in Port Moresby, PNG (where a 3.7m is doing the job) than 4055 but as the spectrum analyser photo here shows, for virtually everyone else the lower frequency - first transponder is up to 2 dB stronger. Levels on 4055 went down 1 dB and have stayed down since 4095 came on the air January 3. Biggest disappointment to date - 2m size required in Pago Pago (American Samoa) where a 1.5m should have done the job. Additionally, the expected conversion from FTA to Nagravision occurred January 28 - only Fiji One (4055) remains FTA (new PID tables activated February 1-3; reloading required).



Japan's loss of JCSAT1B (p. 8) was temporary. The firm had "written it off" and was moving a replacement to 150E when technicians were able to re-establish contact. The satellite was "missing" for around 30 hours - perhaps captured by an alien craft, dissected and then put back into position. Take me to your leader?

The sky is falling. Failure of I804 (p. 8) drove home the reality that for a vast area of the Pacific stretching from Antarctica's Scott Base to the Solomon Islands, a single satellite, vulnerable to failure, is their only communications lifeline. New Zealand and Australia may have high capacity fibre (through Fiji, Hawaii and states, or alternately Singapore and Japan) but for the millions who live and work in 20+ island nations and their hundreds of thousands of relatives living in Australia and New Zealand, I804 was the only real-time link. When a bird like this fails, how do you communicate with isolated islands such as The Cooks to advise them a replacement service is being activated on I701 or perhaps NSS-5, and, provide new bird pointing and equipment adjustment instructions? And for even more isolated islands such as Tokelau, with no local folks capable of repointing a dish to a new bird, the wait can be (and was) weeks before a qualified person can be flown in. Intelsat, meanwhile, was focusing on a different issue. It, like subsidiary New Skies, is being "sold" to a "private equity consortium" and I804 is the second Intelsat bird to experience serious problems in the last 3 months. Does this make Intelsat worth less, or, a bad investment risk? The big guys are worried about billions of dollars while the lady in Honiara who needs a doctor in Sydney to advise her local doctor how to perform a life saving operation is counting backwards from 10,000 while her sedation takes effect.

Accuracy and Quality



Unaohm measurements are based on sound engineering principles that have been confirmed in some of the foremost engineering laboratories. BER precision is assured as the same BER systems are employed from the top of the line EP3000 all the way down to the new handheld models.

Features include Modulation Error Ratio, Data Logging, Spectrum, Expanded Spectrum and simultaneous views of any seven transponder signal levels.

S20 for Satellite QPSK, T40 for COFDM or C30 for QAM, complete the handheld family. And they all ship with a robust rubber holster and neck strap.

It's nice to save a few dollars, but if that means you buy a less than accurate instrument - is that wise?

Unaohm has almost 70 years of instrument manufacturing experience. Coupled with Laceys.tv factory trained support, your investment is assured.

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Digital and Analogue, Terrestrial, Satellite or Cable.

Bless the RI!

"I have been trying to get reception on AsiaSat 3S vertical but with no joy. Up around 1350 MHz L-band there is a REALLY strong signal that just blots out everything. I sent an e-mail to the Radio Inspector office in Auckland, not really expecting a reply as my complaint was concerning C-band reception. Therefore I was blown away when I not only received a response but they would dispatch a field engineer to help me diagnose the problem; wonder of wonders. Sure enough he arrived, made some measurements and said he'd get back to me. And in a few days, indeed he did. My problem was originating at a transmitter located at the Horokaka terrestrial transmitter site, LOS to me. It seems the signal, either at C-band 3800 or L-band 1350 (I am not certain which) is a 'link'. Culprit found. But, as he explained, 'Your satellite reception is not licensed' whereas apparently it is possible for folks such as TVNZ to get a 'receive license' which creates a 'no-fly-zone' for other users of the spectrum in the vicinity of their (downtown Auckland) satellite reception antennas. So I will not be able to use As3S after all but do wish to go on record as applauding the response (time) and effort put forth by the Radio Inspector's group."

Paul Burton, Waipu Cable TV, NZ

Very interesting indeed! Perhaps there is a much larger lesson here as relates to the continuing threat from UNwired and other 3.4-3.6 GHz transmitters. No C-band terminals are licensed (exception: those authorised for professional installations and/or including uplink authorisation)? Therefore no protection? So what happens if several thousand apply for a license - is there a provision (whether in NZ or Australia) to allow government to grant licenses to individual receive-only terminals? Stay tuned.

This is crap

"SF #125 suggestion that new French FTA RFOTV I701 is a 'language war' is crap. It has nothing to do with Fiji TV. RFO's Global C band transponder agreement ran out 31 December and it is cheaper to rent Ku x 2 than one Global C. Plus it allows faster disaster recovery as sites are now powered directly by the satellite."

Steffen Holzt, New Caledonia

Explanation accepted even if it "looked" suspicious! So it is a "band war" (C versus Ku) and not a "language" war.

HARDWARE EQUIPMENT PARTS UPDATE

FEBRUARY 15, 2005

Gadgets just keep on coming! One of the "hot" Christmas items in the USA was a video-iPOD kind of device - variations allowed you to transfer movies, other video + audio from a hard drive to an internal memory for take-it-with-you viewing. A 4" LCD screen combined with various internal hard drive options allow 2 to 20 hour video-to-go. Concept is that you have a pocket-size battery operated device completely free of the net or any other connection. BSkyB (UK) says they will release "Sky +" for satellite subscribers "sometime in 2006" allowing 40GB of hard drive transferred material to move with you. Using USB port(s - 2) several hours of material, previously recorded on your Sky + home PVR, is transferred to the "Sky + to go" package. Another recently announced BSkyB package uses the subscriber's existing Digibox (IRD) as a source, retransmitting radio stations received by the satellite receiver to portable receivers that can go with you around a home or yard. No, there is probably no reason why the sound portion of a TV broadcast could not be rebroadcast in the same manner. SatFACTS has previously shown how an inexpensive 100 mW FM band transmitter can do the same thing, broadcasting satellite audio or TV audio to a portable FM receiver.

Shifting magnetic poles. In eras past, the earth's magnetic poles (north = positive, south = negative) have flipped (south = positive, north = negative). Evidence from special design low and medium earth orbit satellites measuring the earth's magnetosphere (magnetic lines of force that surround earth and connect the two poles) points at a newly discovered instability that scientists suggest points at a new flip - *coming*. During solar storms (p. 8, here) a "magnetic anomaly" has been measured that is worrisome. All satellites use magnetic *north* as reference.

No insurance? Intelsat I804 satellite lost January 15th Pacific time was not insured; a write-off of US$73 million.

Ka band by DirecTV? Murdoch's folks claiming their will distribute high definition TV to US DirecTV subscribers has received thumbs-down response from competitor Echosphere/ DISH TV. They say their own extensive testing of Ka band (18-20 GHz) finds rain outages are significantly worse at Ka than Ku and customers will find the service erratic. One would think Murdoch's engineers would have worked this out before committing to Ka band satellites (now under construction).

Research group, Enders Analysis, in running the numbers on what UK's terrestrial DTT switchover will cost consumers in UK, includes this line. "The largest single component cost over the next 20 years in a switchover estimated at six to seven billion pounds Sterling, is 3.5 billion for the electricity to operate the STBs." Ooops.

Australia currently has 135 TV set models (15 brands) offering "widescreen" displays, starting from A$699. Alas, only one (1) HDTV model, A$8999. STBs? 13 models, from A$499.

Phoenix Technologies

Satellite Equipment & Accessories One Stop Supermarket

Phoenix JT3100T Digital Terrestrial Receiver

- Digital Audio Output (S/PDIF)
- Dolby Digital
- Wide Screen (16:9) Hot-Key
- S-VHS, CVBS & RGB Video Outputs

- Super-Fast Channel Scan
- Electronic Program Guide
- Channel Rename Function
- Software Upgradeable

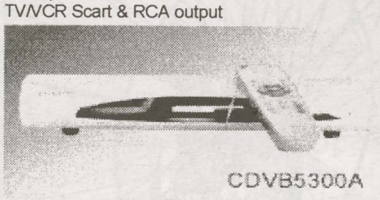
$180/each (for 6 unit)
$160/each (for 30 units)

Magix 8800 Receiver $220
(Made in Korea)

Coship digital receiver $220
(Iredto V2.09 CAM embedded)

SPACE 5300A CI Receiver $180
(Two Common Interface Slots)

Auto PID correction
C & Ku band input
PAL/NTSC auto converter
5000 channels
Picture in picture EPG
DiSEqC1.0/1.2 control
TV/VCR Scart & RCA output



CDVB5300A

SPACE 2300 digital receiver $140
Auto PID correction
C & Ku band input
PAL/NTSC auto converter
5000 channels
Picture in picture EPG
DiSEqC1.0/1.2 control
TV/VCR Scart & RCA output

NextWave 3220 FTA digital receiver $160
(Made in Korea)

C & Ku band input, PAL/NTSC auto converter
5000 channels Picture in picture EPG
DiSEqC1.0/1.2 control
TV/VCR Scart & RCA outputs

NextWave 3220C digital receiver $220
(Two common interface slots) **(Made in Korea)**

C & Ku band input
High symbol rate >45,000
PAL/NTSC auto converter
5000 channels Picture in picture EPG
DiSEqC1.0/1.2 control
TV/VCR Scart & RCA outputs

Irdeto 2.06B CAM	$140	Zinwell C band LNBF	$35
Viaccess CAM	$140	Zinwell 10.70/11.3 /Universal Ku band LNBF	$25
65cm offset dish	$27		
75cm offset dish	$40	MTI C band LNBF	$35
Superjack DiSEqC 1.2 motor	$95	One cable solution C-banc LNBF	$50
Universal Mount	$15	Satellite finder	$30
2.1m mesh dish	$120	Silver Card (10/bag)	$125
2.3m mesh dish (motorized)	$170	Gold Card (10/bag)	$85
		RG6 Stripper	$20
2.4m heavy duty mesh dish (motorized)	$210	RG6/11 Crimper	$30
1.8m 6 panel dish	$130	Angle meter (made in USA)	$85
RG 6 Dual cable (305m/roll)	$75	Compass	$30

Optus C1 Aurora Kit
Coship digital receiver

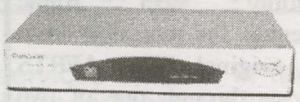
(Iredto cam embedded) 11.3 GHz/Universal Ku LNBF, 75cm dish, Mount bracket. **$315/set** +Aurora card $75

LBC, ART, Al Jazeera Kit
Coship digital receiver

(Iredto cam embedded) C-band LNBF, 2.3m Mesh dish. **$435/set** +Subscription fee $20/month*

Free to air kit (for NSS 6, Optus B3)

Including dish, LNBF, digital receiver, etc. **Start from $250/set**



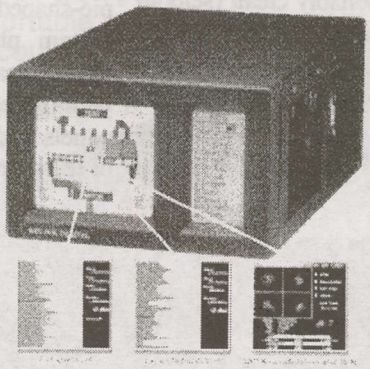
Changhong 1000 Digital Receiver
Aston 1.05 Cam embedded

Best Value For Indian & French
(C-band on Asiasat 3s & Ku band on Intelsat 701) **$170**
C & Ku band input, 2000 Channels.

(Top quality) TESTING EQUIPMENT SPECIAL (made in Sweden)

Satlook MARK III $950
- 4,5" B/W monitor for PAL/NTSC/SECAM
- Satellite-receiver 920-2150 MHz
- Tunable sound 5,5-8,5 MHz
- Spectrum analyzer
- Expanded spectrum
- LNB voltage 13/18 V
- 22 kHz tone switch
- KU- and C-band (normal/inverted video)
- Built in rechargeable battery
- Only 3,5 kg complete with carrying-case

Satlook Digital NIT $1550
We are pleased to introduce our new SATLOOK Digital NIT. NIT stands for NETWORK INFORMATION TABLE, which today almost all DVB-satellites transmit as standard. The NIT contains information about the Satellite and TV/Radio-channels. It's very easy to identify a Satellite when reading out this information. The different TV/Radio-channels on a transponder can also be read-out.



Satlook COMBO $2550
- Input frequency: 2-900 MHz and 920-2150 MHz
- 4.5" B/W Monitor for PAL/NTSC/SECAM
- Lots of memory positions for spectrum pictures
- RS232 for PC-connection
- Built in, rechargeable battery. Only 7kg complete with carrying case

TV-PART:
- 2-900 MHz spectrum analyzer
- Presents full range spectrum (and expanded)
- Very high accuracy, ±1dB (at 20°C)

SAT-part:
- 920-2150MHz spectrum analyzer. Digital BER, QPSK and S/N-ratio
- Satellite-ID and TV/Radio-channel info (NIT)
- Tunable audio bandwidth 5.5-8.5MHz
- LNB voltage 13/18V, 22kHz tone switch
- DiSEqC according to level 1.0, 1.1, 1.2
- KU- and C-band (normal/inverted video)

Full range of C/Ku band satellite dish - panel & mesh, prime & offset, from 45cm to 4.5m
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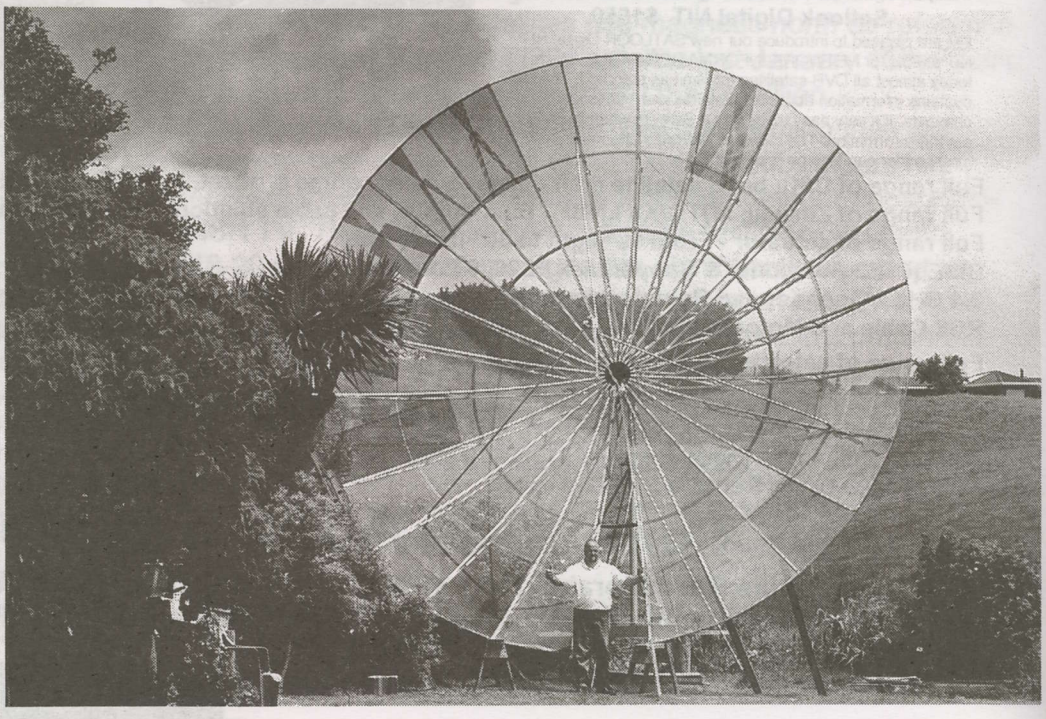
Turning junker antennas into useful tools

Work in progress: Tale of Two Antennas

These two antennas, slightly larger than 7m, were individually rescued from "the junk heap" and with patience, time and skill, are being brought to a useful state of future employment. During the 1980s, a group of clever Kiwi lads situated in the unlikely town of Motueka (northern portion of South Island) began building steel frame antennas for reception from the original FTA AFRTS service through one of two birds situated in the region of 180E. Some were as large as ten metres, a few as small as 5 metres but the majority were +/- 7m because given the technology of the era and the relatively weak (25-26 dBw) footprint of the Intelsat birds, that is what it took to receive reasonably clean (seldom sparklie-free) analogue reception. The exact number so-built has been lost in history but based upon the survivors still remaining, as many as 100 might have been built. At the time, with a much more depressed Kiwi dollar as the foundation, pricing ran in the region of NZ$30,000 including installation. One of these antennas was featured on the front cover of SatFACTS for October 2004 (SF#122), located in Pago Pago, American Samoa.

It is a tribute to the original designers that the steel (later aluminium + steel) fabrication has survived twenty-plus years of unhealthy exposure to the elements, and that these antennas when found in a "junk condition" actually can be put back into service with nothing more complex than elbow grease and time.

The top antenna shown was located in Northern New Zealand having originally been installed (1983) for a pub. In the photo, it has just been attached to the mount and will next have the aluminium pie-shaped reflector material attached (2,500 rivets!) In the bottom photo, Paul Burton (Waipu Cable TV) with his elbow-grease recreated version which he chose to resurface with reflective screen material as the original aluminium panels had been "lost" in storage. Yes, there are plenty more of these 7m monsters hiding out there!



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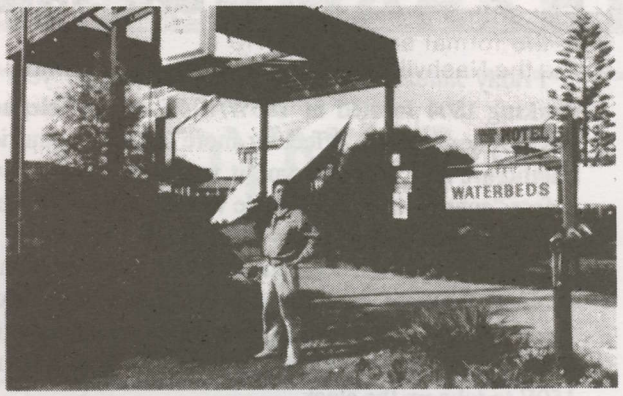


NEW ZEALAND TVRO

THE New Zealand 'Opportunity'

With a population base of just over 3 million people, and a physical isolation which few other countries in the world 'enjoy', New Zealand offers business opportunities to the TVRO industry which are unique in the world. It will surprise some, as it did us, that there is already **the start** of a TVRO industry there.

New Zealand boasts one of the best standards of living in the world today. As a small businessman owning a 26 unit motel commented to us "Most everyone has two cars in their garage, a 'video' (VCR), a modern and comfortable home and money in the bank. What more could we want from life?"

Taxes in New Zealand are extremely high; th... believe them to be the highest in the wor... might quibble with that statemen... remains that for incomes ov... year, the tax bite is around ... earned. Much of this taxati... programs. Medical help, edu... and other 'equalizing subsidie... able to all residents. The countr... ordinary amount each year on p... as the roads. Rural area roads a... best in the world giving that a trave... an hour or more and never encou... vehicle. In areas where agriculture ... (and that includes virtually all of the ... farmers command special attention.

Television service has followed the s... with two 'national' channels (TV New Z... and 1 and 2), there is a system of primary transmitters and low power translators which force feed service into any area where there are ten homes or more. In practice, with primary and translator stations spread all over, most locations can receive the two national signals from multiple sets of transmitters so nobody goes 'without' television. This was a considerable engineering feat given the very mountainous terrain of the country.

New Zealand's AFRTS dish systems were first revealed in Coop's Satellite Digest (CSD) for August 15, 1986. A segment of the report noted, "We uncovered one pub in Auckland that had purchased a 7 metre dish system for around NZ$30,000 solely to receive the Australian weekend rugby matches. When that service was terminated in favour of Ku band Aussat, the pub found its Saturday afternoon gross revenues dropped off by $4,000 per week!" The spirit of Mouteka lives still.

The two national services operate in tandem; there is not much difference between the two in program content. TV1 is slightly 'higher brow' but both come off as a cross between PBS and the BBC for significant parts of the day. There is one striking difference; TV1 and 2 carry advertising and there is no shortage of that. Programming includes the more popular US shows (**Dynasty**, of course plus others such as **Entertainment This Week**, sent down vi... lite) as well as additional imports fr... and Australia. There is a reason... but it is difficult for a coun... le to produce high-... n on limited bud... te but only mar... ic news gather... d reporters vir... lo voice overs ... m has not hit ... way to open ... e first 'pri... ... country ... which com... ...ense. Some of the ... Maori natives in New ...irst English settlers arrived in ... they found a race of Polynesians ...ere. The settlers treated these natives ... about the same initial respect as the American settlers treated the American Indians. They shot them on sight. Some survived, however, and today they make up the only significant 'minority' group in the country. The national 'conscience' demands that the new, third channel include programming of interest to the Maori population. TVNZ already devotes several **minutes** per day to 'News' in the Maori language. The new applicants for the third channel are jockeying for 'popular position' by offering various amounts of programming time and equipment and production facil-

Science Fact - NOT Science Fiction!

How Sunspots eat satellites for lunch

Friday January 14 UTC; 23:10. Intelsat's 7 year old hard working I804 located at 186W/174E quits. Telephone, fax, internet connections affecting more than 20 countries in the Pacific are lost and for some it would be close to two weeks before "contact with the outside world" can be restored.

Saturday January 17 UTC; 12:26. Japan's 6 year old satellite JCSAT-1B, located at 150E, stops transmitting. A nervous Japanese spokesperson announces the satellite has "been lost" and attempts to re-establish communications with it have failed. A replacement, JCSAT-R, would be moved to 150E to take up the slack.

Friday January 13: 12:00UTC. The folks at NASA, who act as the clearing house for virtually all facets of "space weather," release an announcement: "Solar storm on the way - a BIG one!" Yes, there is a connection here - one very powerful electrical connection.

The sun is rising. And so is Sunspot 720, "as large as the planet Jupiter."

Our "benign" sun

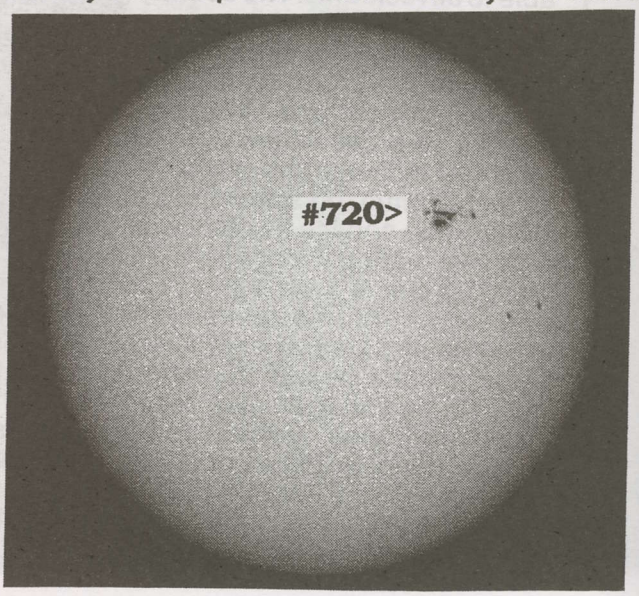
For as long as men and women have stood erect and walked on planet earth, the one aspect of life which seemingly could be depended upon was that for whatever reason, the sun would "come back up" tomorrow. And the day following. Church doctrines taught the earth was flat and the revelation it was mostly round has been with us as a proven fact for only the most recent 500 years. The same drive that sped Magellan to circumnavigate the planet today entices his ancestors to create scientific devices that allow full-time monitoring of the sun and our quite humble solar system. Mankind does this because sooner or later (most are betting later) the sun will extinguish or significantly alter its modus operandi and well - then there will be no "following day dawn." Yeah, that's pretty heavy stuff but men of science are pretty heavy guys (and gals).

Our sun is anything but benign, tranquil, a model of predictability. And that's not unusual for our particular class of sun ("stars" are grouped by scientists into a variety of flavours and colours, depending upon their operating characteristics; no two are alike, each is somehow unique to itself). Ask someone to describe it and many would begin, "It is a big yellow ball in the sky that moves from east to west during the day." Neither segment is correct. It appears yellow to us on earth only because we are surrounded by a multi-faceted envelope of gases which have the ability to alter its colour from our terrestrial perspective. In fact, it is basically white. Nor does it "*move* from east to west" at all; it is we who are moving, rotating on the earth's axis as a slow spinning top in space. And either of these characteristics could change, essentially without warning. The colour of the sun in fact does change, as we shall see, and when that happens, nothing good is occurring; nothing "good" for us, that is. And the speed at which it "moves across the sky" - in fact the speed of the earth rotating on its axis - does change. The recent Tsunami off the coast of Indonesia actually caused the earth's rotational speed to change; our day's are now microseconds shorter than before that event. In a single sentence, we live on a highly volatile planet and it does not take an event "close to home" (the Tsunami) to create significant changes in how we live - or do not live, as the case might be. Global warming? Significant - yes. But chicken feed when compared to what a large asteroid passing by earth (not striking it - just passing by) could do to alter our gaseous envelope (the atmosphere, stratosphere, ionosphere and beyond) and simultaneously throw a time warp into our own earth time keeping system - the 24 hour rotation period. None of this makes for pleasant reading if you are sitting in bed trying to go to sleep - perhaps, "the sun will *not* come up tomorrow."

Sunspots

Chinese astronomers first noticed and began keeping a written record of visible sunspots in the 16th century. A sunspot is an eruption - call it a solar storm - visible on the

Sunspot 720 (of current solar cycle - see text) on January 17. Note position versus January 20th above.



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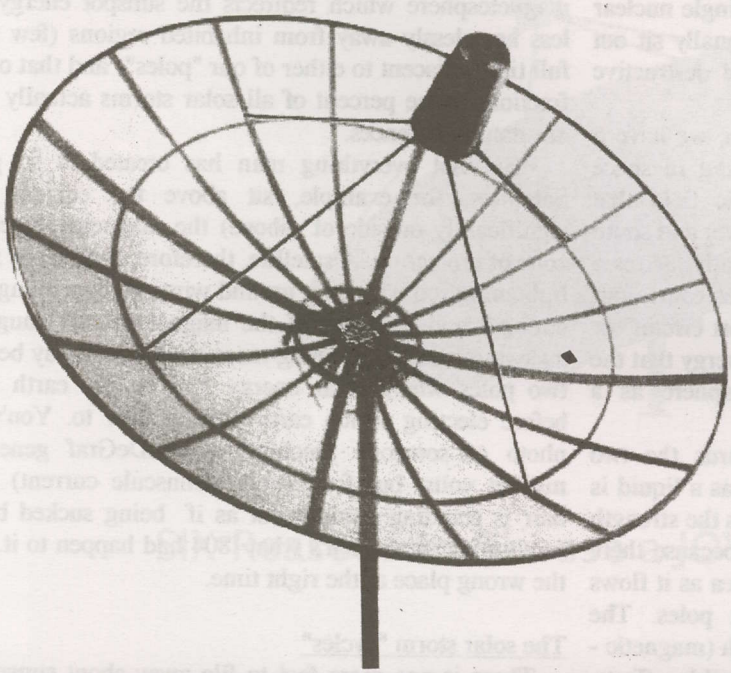

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surface of the sun. Sunspot 720 was by all standards huge - larger across (east to west or left to right here) than the planet Jupiter. Which, if your planetary knowledge is light, is a *spot* approximately 1,125% larger than planet earth. Think of it as a chemical-electrical storm that starts in London, wraps around the earth for a distance of 90,000 miles; nearly four trips around earth!. A single sunspot of this physical size releases energy equivalent to several million manmade nuclear bombs. And just as you would not intentionally stand in a spot where the shockwave and debris of a single nuclear bomb blast might reach you, we do not intentionally sit out here on planet earth while several categories of destructive waves blast out of the sunspot.

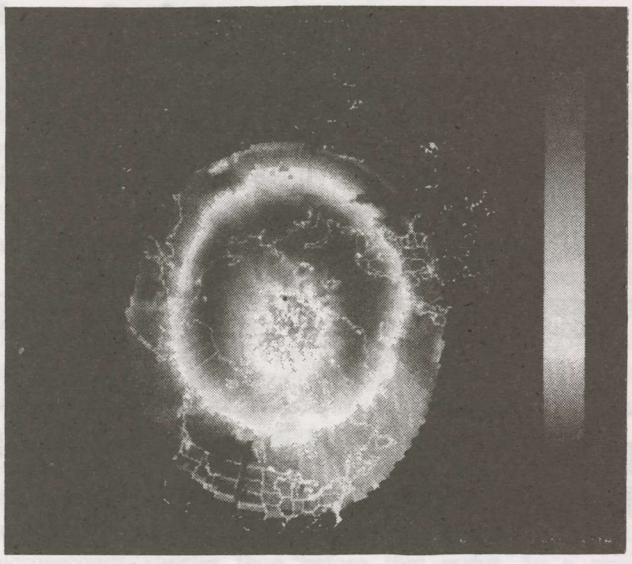
Fortunately for all living organisms on earth, we have a built-in shield - of sorts. Thousands of miles out in space there is a magnetosphere - a strong magnetic field that connects through space our planet's north (positive) and south (negative) poles. The magnetosphere will, normally, act as a deflector shield when radiation from the sunspot comes our way. It does this by providing an "electrical short circuit" or pathway to ground for the electrically charged energy that the sunspot throws off. Think of the magnetosphere as a lightning rod for sunspot electrical energy.

But, when this energy is redirected towards the two polarised poles of earth, it begins to be focused as a liquid is focused by a funnel. And in that focusing process the strength or level of the electrical energy grows - simply because there is more of it occupying a smaller and smaller area as it flows spiral format towards the two natural earth poles. The intensity of the energy, concentrating at the north (magnetic - not physical) pole creates several interesting earthly affects. First there is Aurora - northern or southern "lights" dancing in the sky. The electrical energy ignites (causes to glow) rarefied gaseous atoms in the lower ionosphere (at elevations from 60 to 120 miles above earth, typically), creating the visual light show. At the same time, layers below (in the stratosphere) and above (upper ionosphere) collapse, losing whatever is considered a normal state for their non-electrified condition. Hams will recognise this as an abrupt downward turn in "short-wave conditions" disrupting for hours, sometimes days, normal ionospheric "skip" conditions.

Another effect, less common but hardly unknown even in recent times, is dependent upon the overall strength or power of the sunspot energy. In an especially "severe solar storm," some of the energy penetrates right down to ground earth. And with horrendous impact - a 1979 solar storm wiped out long distance cross country hydro-electric lines in Quebec, for example. We can all be thankful that we do in fact have a magnetosphere which redirects the sunspot energy more or less harmlessly away from inhabited regions (few folks live full time adjacent to either of our "poles") and that only a tiny fraction of one percent of all solar storms actually penetrate our natural defences.

But not everything man has created is so protected. Satellites, for example, sit above the equator and are significantly outside of (above) the magnetosphere's normal zone of protection. A satellite, therefore, potentially is either a lightening rod without a ground wire, or, depending upon the strength and response of the magnetosphere, caught in the awkward position of being more or less half-way between the two poles where solar energy striking the earth "puddles" before electing which earth pole to flow to. You've seen a photo of someone touching a VanDeGraf generator (20 million volts, but fortunately minuscule current) and their hair is standing straight out as if being sucked by a giant vacuum cleaner? That's what 1804 had happen to it. It was in the wrong place at the right time.

Aurora Borealis (North Pole) "spread" at 1655 UTC January 19 following multiple-bursts of energy from Sunspot 720; North pole is in centre, USA "down."



The solar storm "cycles"

There is one more fact to file away about sunspots. They run in 11 year cycles and two 11 years combine into a summary 22 year period. At the end of one 11 year cycle, the sun is typically devoid of any spots or new ones attached to the "next cycle" appear just as the last of the "old cycle" are waning. Within that 11 year period (which is an average - it might be 8 years, it could be 14), all of the "current cycle" spots have an "electrical signature" that identifies them as belonging to a particular cycle. When the signature changes, a new cycle has begun. The solar cycle begins with just a few spots expressing a new electrical signature and then within 3-5 years the number of spots (quantity) grows quite rapidly. A plateau is reached in "sunspot count" and slowly, less rapidly than the rise part of the cycle, the number slowly recedes. A typical spot lasts through 2.4 solar rotations (here is something you might not have known: The sun spins on its own axis, just like earth, and in 28 days it turns completely around for us returning to "same side towards earth"). So new spots are being born, old spots are receding in strength and size, constantly.

The spots developing during years 0 to 5 or so - past the peak and starting back down again - are typically quite harmless, on a scale of #720 being a barn burner. But as the cycle declines, while there are fewer spots, those appearing tend to be significantly larger on average and every now and again there is one monster spot - such as #720.

Being large is not a worry - it is the "activity level" of a spot that makes it dangerous. And for planet earth inhabitants, the location of the spot (and a family of similar non-spots called Coronal Holes, which we shall not discuss here) is key. Spots may spend 14 days drifting over the east limb, across the surface and then around behind the sun (behind - from our

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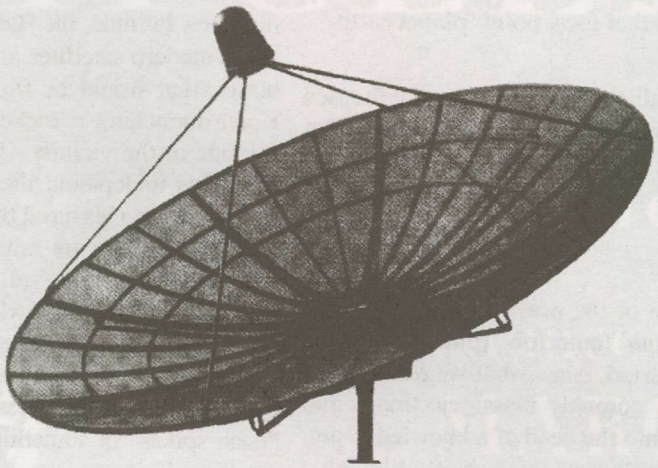

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earthly perspective - out of our view) and nothing happens. They do not spew, do not blow up, do not send quadrillions of electron volts through space. So there is one more element to a sunspot important to consider: Where it is on the sun's surface, *when* it blows its top, and where the interior of the spot (the part we cannot see from earth because it is below the surface) "focuses" or "directs" the radiated energy. Think of the spot, for a moment, as a "parabolic dish" with a relatively sharp distant focal point. Call that focal point "planet earth."

Now, duck.

Fortunately, a majority of all sunspot eruptions are focused someplace other than the tiny dot represented by earth. But like lotto, sooner than later it will be "our number" and some portion (or even all) of the energy from an erupting spot strikes out magnetosphere.

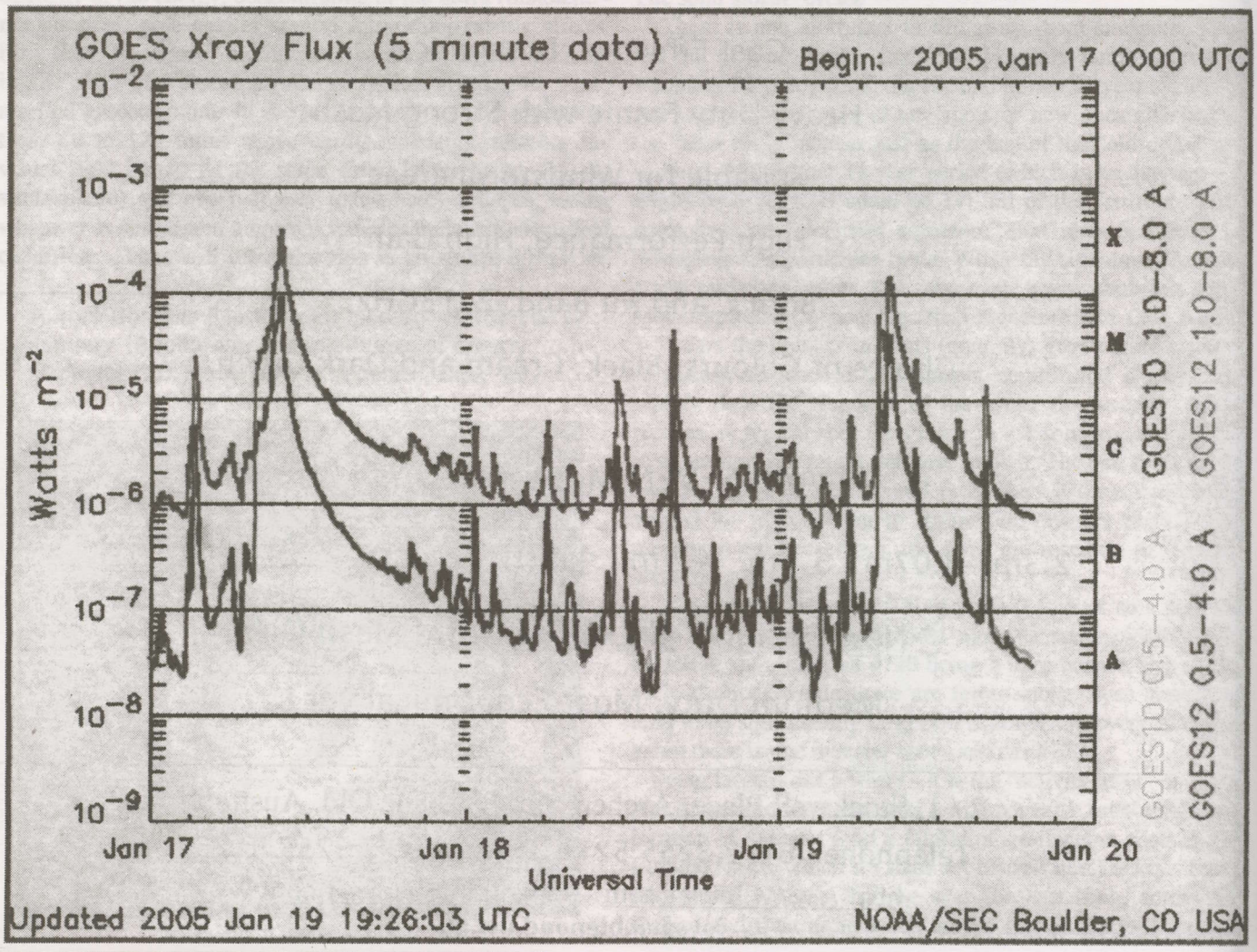
We are currently in year 8 of the present cycle, and from yesterday (mid 2004) through tomorrow (mid 2006) will continue to be a dangerous period. Alas, what we really know about the sun, sunspots, coronal mass ejections and much-much more would fit onto the head of a knowledge-pin. We have barely pricked the surface of this subject although a number of special solar-watching satellites sit out there at various locations collecting data for transmission back to earth for analysis and understanding.

The geostationary satellite. Wrong place, possibly at the wrong time. At 23:10 UTC Friday January 14th, I804 at 176E was sitting at "satellite high noon" with its solar panels spread out like a lady of the evening on a street corner at midnight: "*Hit me baby.*" And it did.

The earth is round and it has a "leading edge" that sticks out slightly further (towards the sun) than the rest - the "high noon spot." So too the satellite in geostationary rest at the high new latitude; the "tall poppy" of the satellite world.

All modern satellites are "hardened" against thermonuclear blasts (that would be in defence of someone such as North Korea launching a rocket with a thermonuclear warhead to explode in the vicinity - but not right on top of - a satellite). Scientists understand thermonuclear - we've done it enough times to have measured the parameters. But a sunspot such as #720 - well, they are rare enough, and when they happen the odds they will "focus" all of that energy on planet earth is so infrequent that our knowledge base is, to be kind, inadequate. If you know the parameters of a radiation hazard, you can (possibly) take steps to "shield" the delicate satellite components from it. Possibly. But we know so little about the "peak spikes" of something as large as #720 that at best the satellite designers are reduced to "picking a number" and building to that number; without respect to whether "that number" represents a worst-case threat or not. In the instance of #720, it apparently did not.

More than a dozen satellites monitor the sun's various parameters 24/7. Here, GOES 12 (top jagged line; located at 75W, and, GOES 10 (lower jagged line; at 135W) show how Sunspot 720 continued to throw off storm level radiation each time the satellites "faced the sun" - for example 1100UTC on the 17th.



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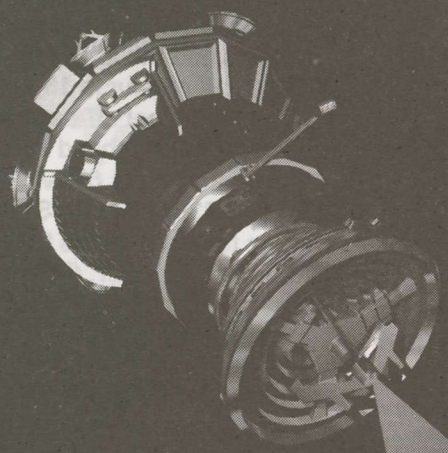

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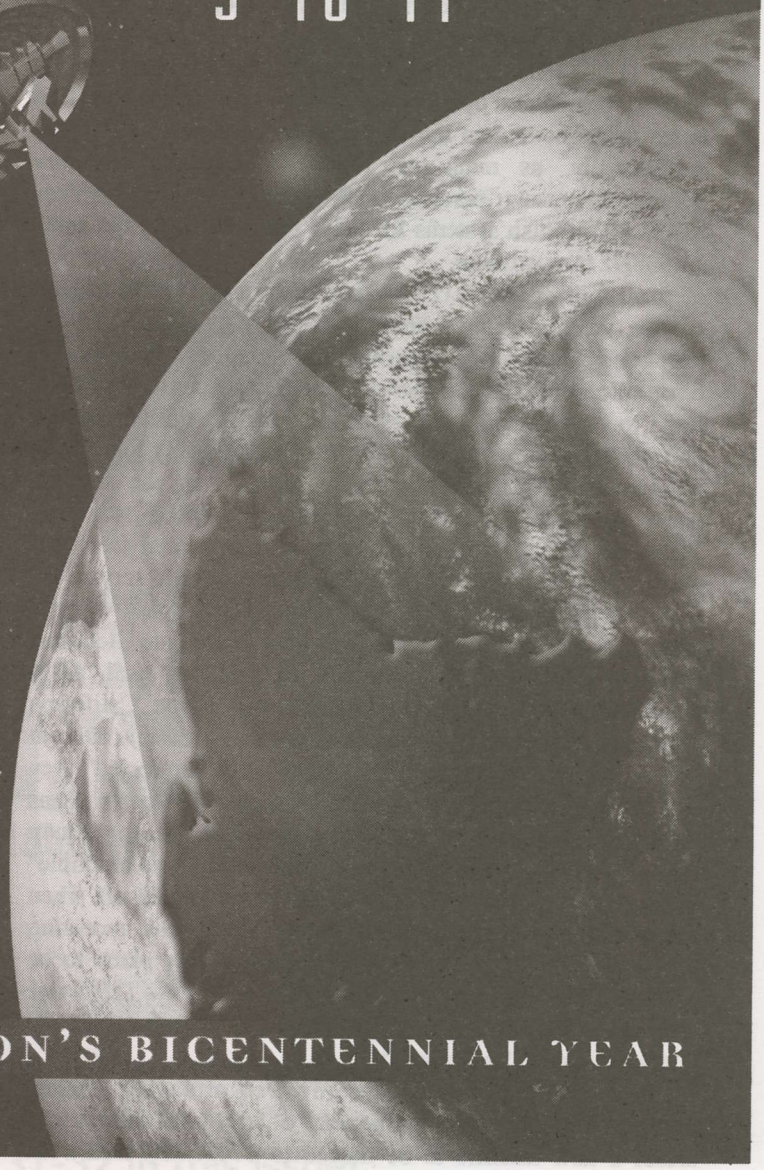

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2006 LAUNCESTON'S BICENTENNIAL YEAR

What we do know about #720 is that at the moment the electrical waves were stroking satellite I804, a series of "further out" (closer to the sun than the 22,300 miles - above the equator - of I804) had been "instrument-pegged" for several minutes. These solar radiation measurement satellites, created to keep a DEW (distant early warning) watch on disruptive solar radiation, had "gone off the scale" and they stayed off the scale (their various measurement instruments are calibrated for "normal" and "extra-normal" levels of radiation measurement - not "super-normal") for hours. This was one very powerful hit!

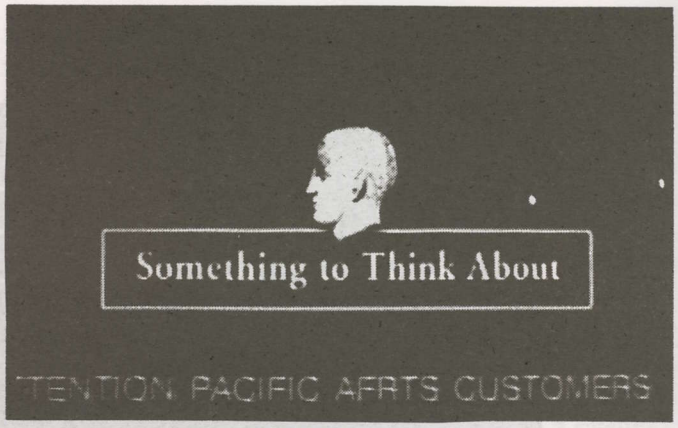
I804/174E

This satellite was launched in December 1997 to 44E, moved to 64E in February 2002 and finally to 176/174E in November (174E, 2004) 2002. It was built by Lockheed Martin, contained 38 variable bandwidth C-band transponders (7 to 38 watts each) and six Ku band transponders at 43 watts. C-band traffic has always been almost totally non-video, and for this reason it attracted little user interest in the Pacific. However, it was a very "full" satellite and as it turned out the majority of the telephone/fax/internet traffic routed to and from various Pacific Island nations went through 804.

On Ku, the American Forces Network (AFN/AFRTS), using SA PowerVu encryption, provided 10 television channels and 13 audio/data channels on a Northeast Asia spot beam (11.638Hz). In turn, these channels were fed through military owned and operated cable television systems on (US) bases throughout Asia but in particular in Korea and Japan. Additionally, as many as 15,000 off-base US military personnel, consular personnel, US government agency offices had Ku band dish systems for DTH reception from the same 11.638Hz transmission.

It all quit at 23:10 UTC Friday February 14. Television service would resume through NSS-6 Ku January 25-26; telephone service required a more complicated resumption-of-service sequence. The first response at Intelsat was to shuck all non-essential, not-big-dollar paying ("protected") users on I701/180E, to clear as many megahertz of available transponder space as possible in the shortest period of time. The Australian feed on 3769RHC, carrying TBN and others, for example, simply disappeared (replaced with island telephone traffic) while the NASA service on I701/3854RHC became unpredictable. TBN would acquire temporary fibre optic space to feed into Australia's Globecast package (along with co-sourced JCTV), as well as a temporary feed on PAS-2 (3901Hz, within the California Bouquet). All satellite operators offer two (or three) different rate structures for transponder space - with "protected" they can not be taken off and if something catastrophic (such as failure of satellite) occurs, they will be in the top group relocated at the satellite operator's expense. In "pre-emptible" space, they run the risk of not only being kicked off when some user of a higher priority comes along, but, receiving very little (if any) assistance in finding a new place to be carried. TBN was pre-emptible, as is NASA TV. Telephone services are, typically, only "protected" or as they say in the telephone world, "guaranteed."

Permanent restoration also involved arranging C-band space on NSS-5/177W; "permanent" at least until Intelsat can create a new satellite to be moved to 174W. By mid-week January 24-28, many of the island circuits were in fact back up and running through NSS-5 although the medium and long term prospects for this satellite to continue to be available for this purpose remains in question.



When AFRTS disappeared from 804, an alternate service on I701 (C-band, PowerVu, 4175LHC), known as DTS (Direct to Sailors), began crawl announcements advising their temporary status as an interim service provider. American military cable systems had the ability to change from the missing Ku to C but of course 15,000 small-dish Ku receivers at individual off-base sites did not. AFRTS re-established Ku band service from NSS-6 (95E) on January 25-26 (11.676Vt, Sr 28.000, 3/4; previously was 11.638Hz, same Sr and FEC) - thousands of dishes to move, feeds to twist and a new frequency number to enter. (Photo courtesy DB, Taiwan)

The "whisker" debate

Most satellite owner/operators carry "calamity insurance," protection against a sudden loss of service and revenue (it happens that Intelsat "self insured" for I804 - a US$73 million write-off in this case). The insurance policies are built around the number of years of service remaining - a 15 year lifetime satellite, for example, launched in 1997 would have 7/15 life left and over that period of time could be expected to earn an amount of revenue that could be calculated. The insurance pay-out amount and the annual premiums would reflect this condition (just as your auto insurance goes down year by year because your car's value has depreciated, so too with satellites).

But there are conditions attached - pre-emptive situations where the insurance company either "wiggles out" from paying or reduces the amount they will pay. This is the "whisker debate" issue.

Over the years there have been a number of satellite failures for which the available evidence could not allow a definite conclusion to be drawn. This class of failures has been frequent enough that by the sheer number a new "plausible co-failure theory" has been postulated. It is called the whisker loss theory.

We don't normally associate "growth" with metal - a piece of metal is a piece of metal and once formed we assume it will stay in the formed mode forever. But there are conditions, apparently amplified in a space near-vacuum, where under the wrong combination a piece of metal will indeed grow. When contacts on a relay are "made" (voltage applied) and "broken" (voltage turned off), these contacts create an "arc" of electrical energy - think of it is a short term, very small, lightning stroke. The arc, in a near

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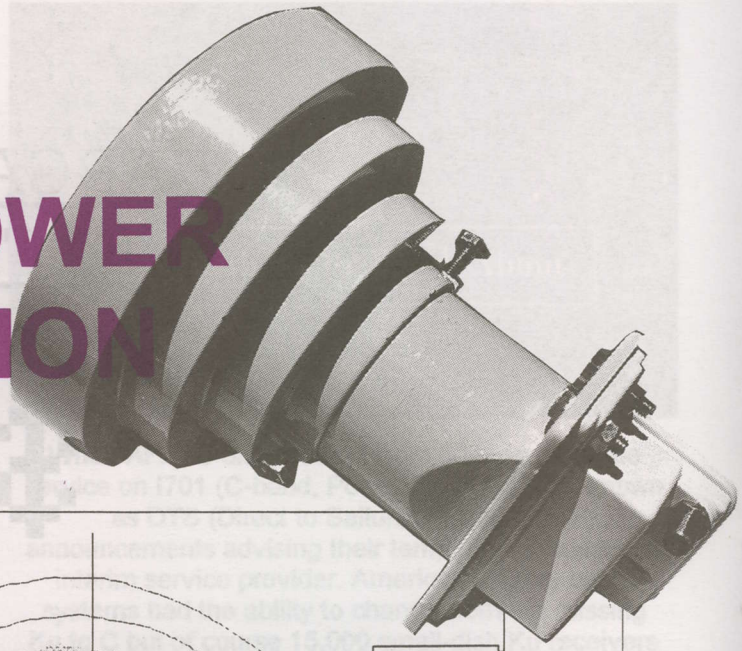

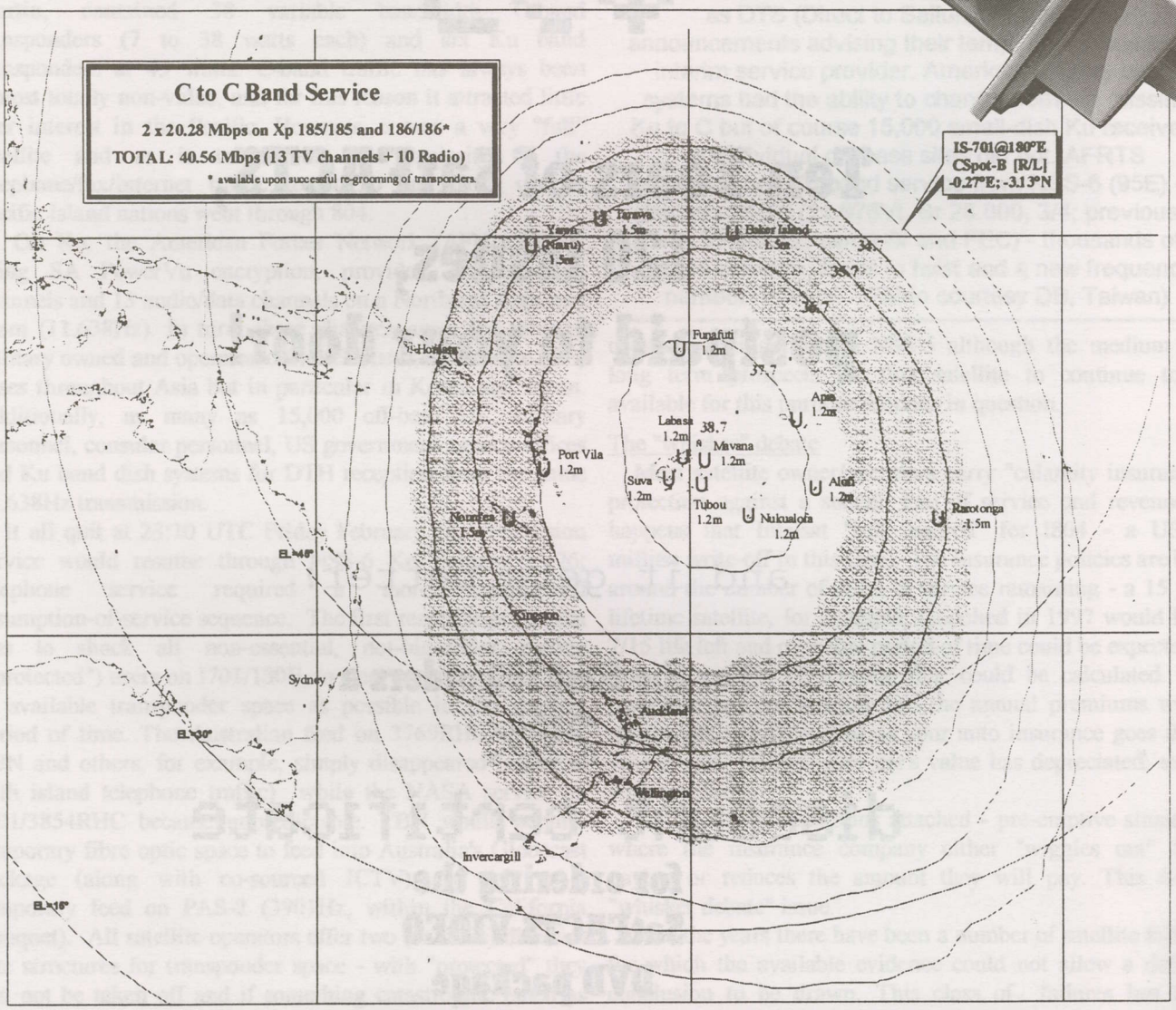

To receive Fiji TV's 12 channel service, contact us for assistance!

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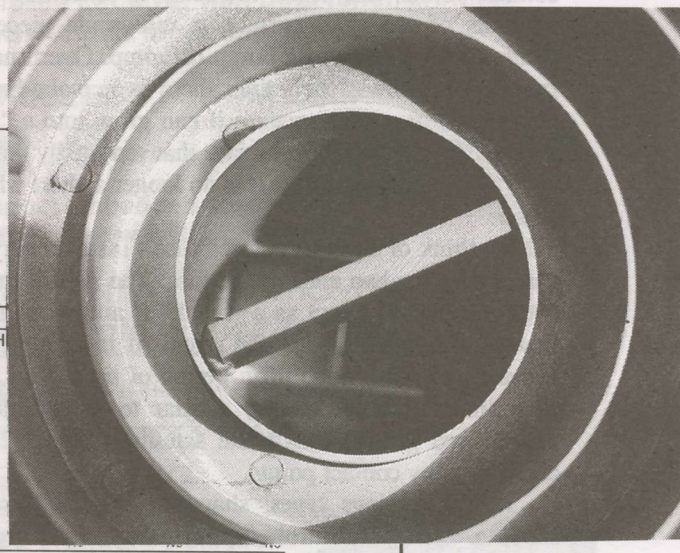
WE KNOW CIRCULAR!

Link Analysis in CSB / CSB beam connectivity on 701 satellite at 180.00 ° East



A	**SATELLITE DATA**		
	Satellite	701	
	Satellite orbital location	180	
	Beam (receive/ itransmit)	CSB	CSB
	Transponder number (uplink/ downlink)	85	185
	Transponder frequency (uplink/ downlink)	6.28	4.055
B	**TRANSPONDER BC DATA** @ BC		
	Transponder bandwidth & resource bandwidth	36	
	Saturation e.i.r.p. at beam center	38.7	
	Transponder Flux density at beam center	-93.0	
	Transponder G/T (receiving system sensitivity)	-1.5	
	Operational mode	Single carrier	
	Transponder input back-off	-1.0	
	Transponder output back-off	0.0	

C	**EARTH STATION DATA**	L 1	L 2	L 3	H
	Transmit Earth Station	HUB	HUB	HUB	
	Antenna diameter	6.3	6.3	6.3	
	Latitude coordinates, North(+) South (-)	-18.10	-18.10	-18.10	
	Longitude coordinates, East (+) West (-)	178.40	178.40	178.40	
	S/C aspect correction at E/S	1	1	1	
	Antenna elevation angle	68.7	68.7	68.7	
	Antenna true azimuth	5.14	5.14	5.14	
	Voltage axial ratio	1.06	1.06	1.06	
	Cross-pol isolation	30.7	30.7	30.7	
	Tracking capability	No	No	No	

	Receive Earth Station	Suva	Funafuti	Port Vila	Rarotonga	Nauru	Tarawa	
	Antenna diameter	1.2	1.2	1.5	1.8	1.5	1.5	m
	Latitude coordinates, North(+) South(-)	-18.1	-8.6	-18.3	-21.2	-0.5	2.0	Degrees
	Longitude coordinates, East (+) West (-)	178.4	179.2	168.6	200.1	167.0	174.0	Degrees East
	S/C aspect correction at E/S	0.7	1.2	2	3.7	3.2	3.2	dB
	Antenna elevation angle	68.7	79.8	64.9	56.3	74.7	82.6	Degrees
	Antenna true azimuth	5.14	5.33	32.71	314.66	87.84	108.37	Degrees
	Voltage axial ratio	1.3	1.3	1.3	1.3	1.3	1.3	
	Cross-pol isolation	17.7	17.7	17.7	17.7	17.7	17.7	dB
	Figure of merit, G/T at 4.0 GHz	12.0	12.0	14.0	15.6	14.0	14.0	dB/K
	Computed receive station G/T	12.0	12.0	14.0	15.6	14.0	14.0	dB/K
	Computed receive gain G at 4.0 GHz	32.0	32.0	34.0	35.6	34.0	34.0	dBi
	Tracking capability	No	No	No	No	No	No	

D	**CARRIER DATA**	L 1	L 2	L 3	L 4	L 5	L 6	
	Carrier description code	DVB-2	DVB-2	DVB-2	DVB-2	DVB-2	DVB-2	
	Modulation scheme	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	
	Information rate	20280	20280	20280	20280	20280	20280	kbps
	Overhead	0.0	0.0	0.0	0.0	0.0	0.0	kbps
	FEC coding	0.667	0.667	0.667	0.667	0.667	0.667	
	RS outer coding	204/188	204/188	204/188	204/188	204/188	204/188	
	Transmission rate	33008.2	33008.2	33008.2	33008.2	33008.2	33008.2	kbps
	Carrier's allocated bandwidth	22.2810	22.2810	22.2810	22.2810	22.2810	22.2810	MHz
	Carrier's IF noise bandwidth	16.5041	16.5041	16.5041	16.5041	16.5041	16.5041	MHz
	Number of assigned carriers 1	1	0	0	0	0	0	#
	Required Carrier Performance							
	C/N threshold	6.1	6.1	6.1	6.1	6.1	6.1	dB
	Eb/No threshold (Info+OH), Analog S/N	5.2	5.2	5.2	5.2	5.2	5.2	dB
	U/L rain margin	1.4	1.4	1.4	1.4	1.4	1.4	dB
	D/L rain margin	1.50	1.50	1.50	1.50	1.50	1.50	dB
	Annual availability	99.964	99.964	99.964	99.964	99.964	99.964	%

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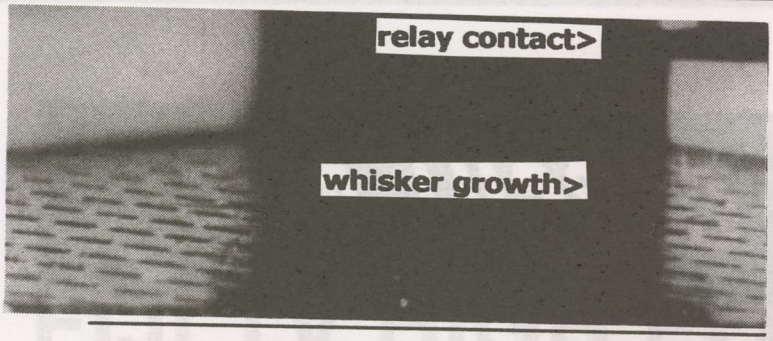


vacuum, is an initially invisible "trail" between the two contact points. But when the relay is switching significant amounts of electrical current, a minuscule piece of the contact begins to build a bump or hump. Overtime, this tiny raised area grows, each time there is a make-break of the relay. And in a near-vacuum it can grow into a "whisker" - think of it as a whisker on a face that repeatedly fails to be cut until after a period of time it is no longer a short whisker, it is a hair.

Now think of a glass enclosed fuse - inside a very fine wire connecting the two ends of the fuse. The size of the wire has been engineered to act as a "break" if and when the current flowing through it (from the circuit it is "protecting") rises above a specified value for a period of time. This minuscule wire "fuse whisker" is very similar to the unintended and non-desired growth inside the satellite powering (or other) circuitry relay contact points.

Relays, various types, shapes, sizes, are throughout a satellite. They control upon command or software programming the satellite's attitude, solar collection arrays, even the thrusters which are used so very occasionally to perform small repositioning manoeuvres for the satellite.

The available 804 evidence suggests the satellite suddenly moved - under its own control (which means it had no control at all). That this occurred at almost the exact instant when powerful radiation from #720 was bathing the entire bird with megavolts of solar energy presents a quandary. In fact, the energy radiating from #720 had been on a steep rise for several hours, and would continue to be well above "safe limits" for several additional days.

The "whisker theory" advocates suggest that energy from the solar radiation penetrated the normally protective hull of the spaceship, coupled into electrical and control circuit wiring, and perhaps - "perhaps" - fired through a "whisker" which connected the thruster circuits causing one or more to fire. And, so the theory goes, the satellite having its motors running, simply responded by scooting away into space. Nobody apparently knows where it went.

NASA Goddard Space Flight Center
Whisker Failures

Failures identified with "whiskers" are more common than the following "public-admission" list quantifies. As NASA notes, "formal identification of whisker failures is often unwanted by the individuals/organisations involved."

DirecTV 3 / 4 May 2002: Bird launched 9 June 1995; partial satellite failure.

Galaxy IIIR (PanAmSat)/21 April 2002: Bird launched 15 December 1995; partial satellite failure.

PanAmSat 4/3rd quarter 1998: Bird launched 3 August 1995; partial satellite failure.

DBS-1 (DirecTV)/4 July 1998: Bird launched 17 December 1993; partial satellite failure.

Solidaridad 1 (Mexico)/28 April 1999 partial failure followed 27 August 2000 by complete loss of satellite; launched 19 November 1993.

Galaxy IV (PanAmSat)/19 May 1998 complete loss of satellite; bird launched 24 June 1993 (certainty of exact nature of failure never identified).

Galaxy VII (PanAmSat)/ 13 June 1998 partial failure followed 22 November 2000 by complete loss of satellite.

Boeing/Hughes 601 spacecraft used significant quantities of tin plated relays in the SCP (satellite control processor) region. The SCP is the on-board computer controlling the satellite and 601 satellites have a redundant second (identical) SCP as a backup. 601 model satellites manufactured after March 1997 *reportedly* replaced tin-plated SCP relays with silver plated relays. It is worth noting that **PAS-2/169E** is of Hughes manufacture, launched July 8, 1994; **Palapa C1** and **C2** are also Hughes design, launched in 1996. Silver (or gold) plated contacts are believed to be less vulnerable than tin but only time will prove this.

"Whisker growth" leading to failures in other areas of electronics have become commonplace. Reports include the following areas of failure: U.S. Missile Program, F-15 Radar systems, Phoenix Air-to-Air missile program, Patriot Missile program, human-embedded heart Pacemakers, industrial power supplies used in manufacturing, long-haul elevator systems, power switching systems within office computer networks.

Summary of the technical side of "whiskers"

"Experimenters report the incubation period for whisker growth may range from days to years. Tests to verify that whiskers might develop in a particular circumstances are made more difficult because the growth period may require very long periods of time. Growth rates ranging from 0.03 to 0.9mm per year have been reported. The growth rate is highly variable and is likely to be determined by a complex relationship involving (contact point) chemistry, plating thickness, substrate materials, grain structure and environmental storage conditions.

"Tin whiskers, some strong enough to cause a short circuit, are present in unfailed field relays. However, given that the internal pressure (at the relay) is one atmosphere, it might seem surprising that a tiny whisker could initiate a high-current case-rupturing discharge rather than (the relay) simply melting 'open circuit.'

"A NASA parts advisory says, 'At atmospheric pressure, if the available current exceeds the fusing current of the whisker, the circuit experiences only a transient glitch as the whisker opens. In a space vacuum, however, a much more destructive phenomenon can occur. If currents of above a few amps are available, the whisker will fuse open but the vaporised tin may initiate a plasma that can conduct up to 200 amps! An adequate supply of tin from the plated surface is necessary to sustain the arc."

"Silver whiskers" have similar but not identical problems - forming from silvered parts.

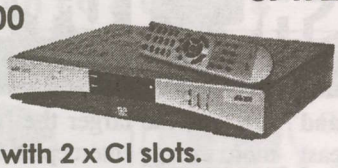
KRISTAL electronics
ABN 78010884938

25 Cataract Ave Rangewood
Townsville, Queensland 4817

Phone: (07) 47888902 Fax: (07) 47888906
eMail: philip@kristal.com.au
Web: http://www.kristal.com.au

SATELLITE

homecast eM200



Digital Satellite Receiver with 2 x CI slots.
and Irdeto 2.09 CI cam.

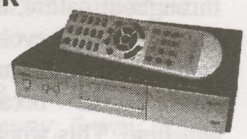
homecast eM320PVR

Satellite Receiver with Dual Tuner, firewire, and 44 hours recording *with Irdeto 2.09 CI cam.*

homecast eM300PVR

Satellite Receiver with CI slots & 22 hours recording *with Irdeto 2.09 CI cam.*

homecast eM150IR

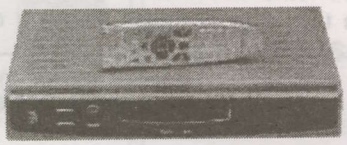


Compact embedded Irdeto Satellite receiver with 1 card slot.

*All the above receivers are suitable for receiving the Irdeto encrypted KU programming from **NSS6 satellite** with the appropriate authorized smart card.*

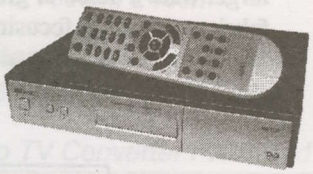
TERRESTRIAL

homecast HT5000



HD High Definition Digital Terrestrial Receiver with DVI output.

homecast eM1150

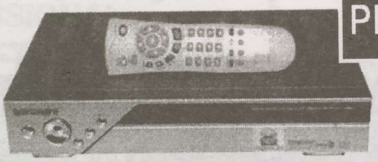


SD Standard Definition Digital Terrestrial Receiver with modulator.

Homecast Australia site for terrestrial receivers is at **http://www.homecast.net.au**

For SATFACTS readers only

FORTEC STAR 5100 PLUS +ULTRA $399



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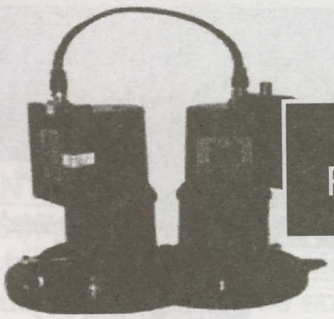

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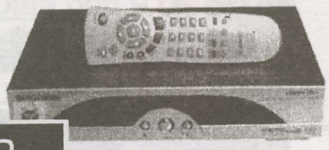

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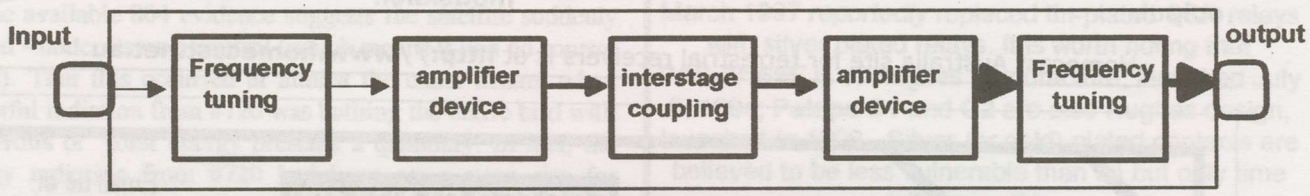
Technical Topix

Of all of the devices we commonly employ in satellite and cable distribution work, the "amplifier" is perhaps the least understood and appreciated. "Gain" - the ability to create more something from less of the same commodity - occurs throughout nature, all around us. A blade of grass begins life short in length evolving from a germinated seed, it grows to "gain" height just as most living organisms do. The blade of grass "gains" because it is fed nutrients, moisture and sunshine. This would be called "active gain" for without the contributions of other ingredients (soil nutrients, water, sunshine) there would be no growth and no "gain." In our particular field of endeavour we have "active" gain and we also have "passive gain." A dish antenna creates the latter - not because it is fed nutrients but simply because size begets signal energy capture. A tree "captures" more sunshine, nutrients and water because its rooting system is significantly larger than a blade of grass's capture ability. A piece of metal, fabricated into a focusing system, captures energy from the satellite; the larger the "capture area" (size of the dish), the more energy intercepted and therefore the "gain of the dish" increases in direct proportion to the size of the dish.

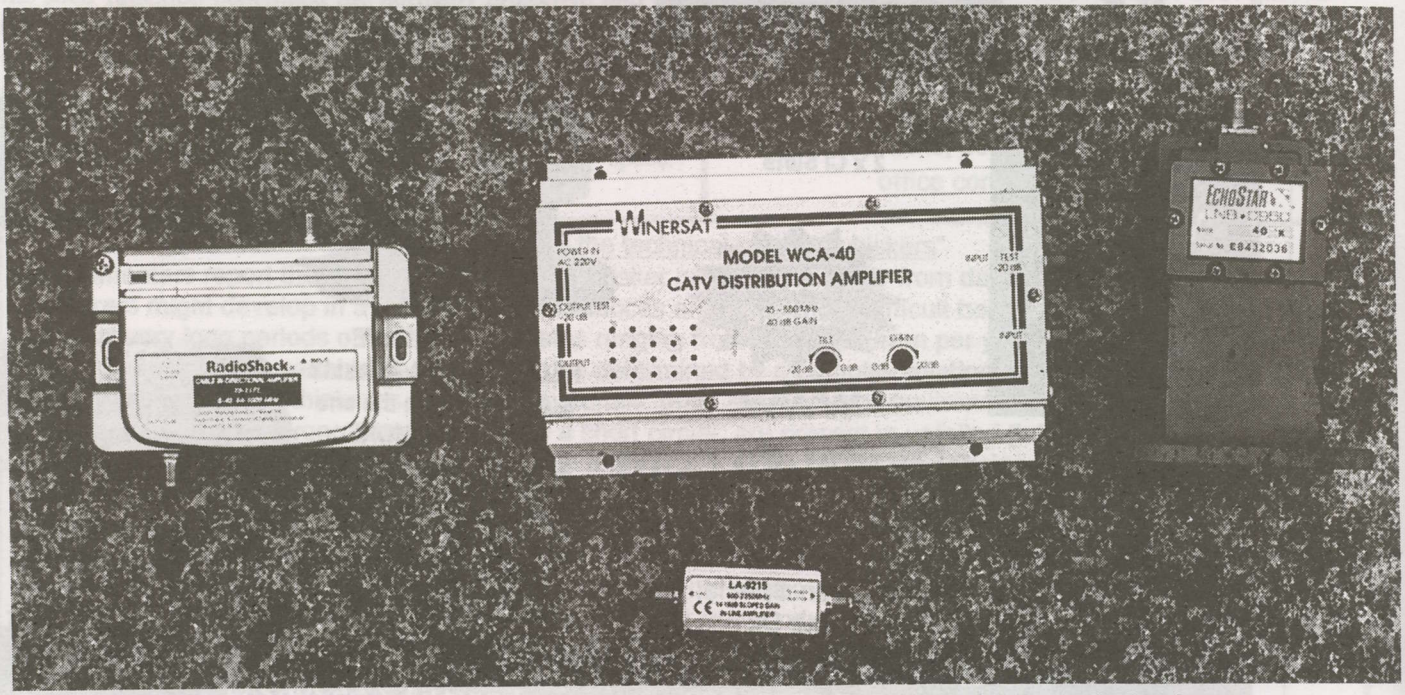
But even a very large dish cannot capture sufficient signal energy from the satellite to connect directly to a receiver. On a scale of blades of grass and trees, the passive dish contributed signal is the former; tiny. Moreover, it is battling for survival against the common enemy that plagues all categories of communications; *noise*.

The LNB(f) is first and foremost an "amplifier," and secondarily a frequency transposer. The two functions are housed in a common metalised container but are independent of one another - provided only that the amplifier portion creates enough "gain" to allow the frequency conversion portion to function; a signal "voltage" too close to the "noise" inherent within the system cannot be frequency translated (such as 12.250 GHz to 950 MHz). Virtually every amplifier ever designed shares a common heritage with every other,

Basic amplifier (two gain stages); power supply not shown



(exterior) housing shielded to prevent egress/ingress



Size and use may not matter - inside, each of these amplifiers follows the same design format.

WAVELENGTH communications

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Singapore (188504)

Phone # +65 6332 2275
Fax # +65 6334 3017
Email sales@wavelength.com.sg
Website www.satellite.com.sg

TOPFIELD

TF3000CI*pro*	Common Interface
TF3000CIP*pro*	CI with Positioner
TF3200IR	Irdeto embedded
TF4000FI	FTA
TF4000PVR	with 40GB HDD
TF5000PVR	with 80GB HDD

SUPERJACK

Positioner
EZ-2000
EZ-4000
EZ-6000
VBOX II DiSEqC 1.2

Also Available:
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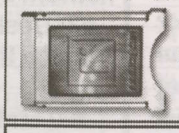
SG 2100A

DG-120
DiSEqC H-H Mount

REALITY CAM



Compatible with:
CryptoWorks, Conax, Seca 1+2, Irdeto 1+2, Viacess 1+2
Also available: - Irdeto CAMS - Viacess CAMS

MTI LNBF

Single Universal Ku	*AP8-XT2*
LO 11.3 Ku	*AP8-T2J*
Prime Focus Ku	*AP8-TWF*

MAXPLUS **HTS 9300+ Receiver**
Multi-CAS Single slot card reader (Viaccess-2, Seca-2, Irdeto-2, Conax)

2.4GHz A/V Sender (TR.2420) with RC extender

Sat-Finder (SF-95)

Angle Level Meter (A100, A300)

DiSEqC 2x1, 4x1 Switches
13/17V, 0/12V, 0/22KHz Switches

Splitters (TV & Satellite)
2 way, 4 way, 6 way, 8 way

Mesh Antenna (Dynasat, PSI)
2.1m, 2.4m, 3m, 3.7m

Solid Antenna
65cm,75cm,90cm, 120cm, 150cm,180cm, 240cm

Cables
RG-6, RG-11 / 100m, 305m

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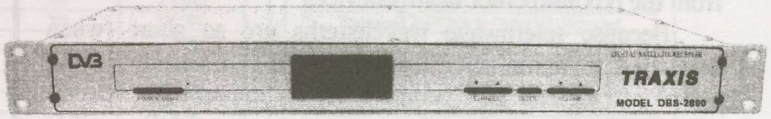

TRAXIS DBS-2800 19" rack mount digital receiver - ends cumbersome "consumer receiver" lash-ups in SMATV, CATV headends! Everything you would ask for in a FTA professional receiver: MPEG2 and MPEG-1 compatible, NTSC/PAL/SECAM baseband output, user settable 4:3 and 16:9 image ratios, QPSK for SCPC and MCPC, full DVB FEC rates. LNB(f) 13/18VDC (500 mA max) with short-circuit protection; DiSEqC 1.0. Mains 85 - 260VAC, 50 to 60 hertz, 21 watts maximum draw. Mono, dual mono and stereo audio recovery. L-band input 950-2150 MHz, -65 to -25 dBm, channel bandwidth 36 MHz. Data port 9 pin D-sub type using RS232 protocol, maximum data rate 57.6 Kbps. Mechanical: 480mm (wide), 245mm (deep), 41mm (high; 1 RU).

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even sound/public address system amplifiers. The primary design difference between a PA system amplifier and a Ku band amplifier is the "frequency spectrum/bandwidth" for the amplifier. A public address system amplifier operates at such a low (audio) frequency range that virtually any commonly available component parts will function in an amplifier. However, as the operating frequency increases, common parts no longer function properly - if at all. A Ku band amplifier measures component part sizes in mm and fractions of a mm while an audio amplifier can satisfactorily use component parts (transistors, resistors, capacitors, powering devices) that are measured in centimetres. Size of the parts is a portion of the challenge; even the length of wire leads (into and out of a transistor or resistor, for example) becomes critical as the frequency is increased. a 1mm length of attaching wire at 1 GHz can have as much "capacity" as the designed-for-value capacitor itself. At 12 GHz, twelve times 1 GHz, even a fractional mm wire connecting stub for a part is taboo (which explains "chip" capacitors and "chip resistors" use in 12 GHz circuits).

Parts positioning, along with interconnecting wires, becomes extremely critical in circuit design as the frequency goes up. If the logic of that escapes you, remember that increasing the frequency decreases the "wavelength" or dimension of the actual signal itself. Inside an amplifier, pieces of wire (whether interconnecting parts or attached to parts) represent "unknown impedance transmission lines" - not dissimilar to having chunks of coax inside the amplifier between parts. The only way to deal with this, to eliminate these unwanted "impedance lines," is to eliminate the lines/wires themselves.

In a microwave circuit, even the container itself becomes an element of the circuit design. Metal housings are mandatory to prevent "RF signal leakage" - in either direction: In (ingress) or Out (egress). The microwave wavelengths are so short that a crack in a case lid becomes a "slot antenna" allowing energy to not only escape but actually radiate away from the box into other nearby devices.

Because microwave wavelengths are so short (when compared to audio, VHF or even UHF), a portion of the actual circuit can be "printed" on an appropriate "circuit board." This means that when you open up an LNB or other microwave device, and you spot relatively thick lines several mm in length, which seemingly are open ended and go no place, in fact you are looking at a "tuned circuit" where the copper or silvered "stub" is forming a segment of a tuning system. By varying the length of this etched-on-board "part," the width and the position it occupies relative to other individual parts, the circuit itself can be tuned (the operating frequency or characteristics varied).

Of all of the characteristics of microwave circuit design, perhaps the most important (and the most difficult to duplicate) is the "impedance matching" networks. In a LNB, the input impedance of the first low noise active amplifier stage is, relative to the probe in the antenna-feed, "high." From the output of the first stage through the output of the last stage of amplification, mis-matching of impedance drives down the overall circuit gain and sends up the noise factor/figure of the system. Without proper matching between all separate stages (even the LNB *probe* is a "stage"), energy is lost and the noise figure (sensitivity) degrades. All of which makes home workbench repair of microwave very difficult.

Front-to-back design steps - amplifiers

#1/ Match the amplifier's input impedance to the transmission line impedance from the antenna.
#2/ Match the input impedance at the amplifier fitting to the input impedance of the frequency determining network that precedes the first "active amplifier" stage
#3/ Design the input frequency tuning bandwidth to match the intended input frequency range (such as 3.7-4.2 or 12.25-12.75 GHz).
#4/ Match the output impedance of the frequency tuning bandwidth section to the input impedance of the first "active" amplifier stage.
#5/ Select the first "active device" based upon the intended frequency range, gain desired, maximum through-signal-power, noise contribution (figure) and operating voltage/current required.
#6/ If one or more additional "active gain" stages will follow, the energy after being amplified in the first stage must be "coupled" (sent to) the next active stage. This is done through "frequency selective" networks designed to pass only the segment of frequencies desired at the output end of the amplifier.
#7/ The input impedance of the next stage must be matched to the impedance of the "coupling network" for maximum transfer of energy flowing out of active-stage-one.
#8/ Selection of the second stage active device follows similar but not identical criteria as the first active stage. By the input to the second active stage, the signal voltage is higher (by the dB of gain created in the first stage) and therefore the total through-signal-power coming out of stage two will be higher. All amplifier devices have a "maximum output power rating" and selection of the second (and successive) active stages has to take this into consideration; will the through-signal-power exceed the rated "power handling capability" of the amplifier device?
#9/ Additional stages require coupling circuits (output of preceding to input of following) and impedance matching to create maximum transfer of energy. Additional stages also must consider the ever-increasing amplified signal voltage(s) which effect the selection of an amplification device based upon the amount of signal voltage accumulating after each successive stage of amplification.
#10/ Finally, there is a frequency tuning bandwidth circuit at the very end of the chain of amplification stages, impedance matched to the output of the final active stage, and also impedance matched to the design impedance of the (coaxial) cable that will connect to the output fitting.

Powering considerations

All "active" amplifiers require operating voltage and will draw some calculable amount of current. Powering requires isolation of the powering line from all radio frequency (RF) circuits, protection for individual stages in the event of component part failure, and complete removal of any AC (alternating current) "modulation" from the DC (direct current) active-part operating circuits.

SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 FEB, 2005

Bird	Service	RF/IF &Polarity	# Program Channels	FEC	Msym	Receivers and Errata
Thcm3/78.5	SkyChAust	3695/1455H	up to 3	3/4	5(.000)	CA (#1, 3); FTA audio #2 (dm)
	ANT Greece	3672/1478H	1 TV	3/4	13(.333)	Late July 04: room for more (FTA)
	Korean Central	3665/1485H	1	2/3	3(.367)	Global footprint; changes 02/03.
	TARBS ME mux	3640/1510H	12TV, 12 radio	2/3	28(.066)	CA + 2 FTA(A1TV, IRB3)(
	Ch Nepal	3626/1524V	1	3/4	15(.556)	New 03/03; FTA
	Mahar mux	3600/1550H	11TV, 1 rad	3/4	26(.667)	Thai + Indian services; FTA
	SE asia Mux	3569/1581H	2+ TV	3/4	12(.500)	MRTV3, MRTV (DM)
	RR Sat mux	3551/1600H	8TV,10 radio	3/4	13(.333)	3TV, 5radio inc. Hellas TV Greece FTA
	JAIN TV	3538/1612V	1TV	3/4	3(.300)	PIDs 4132/4133
	PTV1 +	3521/1629V	1TV, 1 radio	3/4	3(.333)	frequency change
	FTA Mux	3520/1630H	12TV, 12 radio	3/4	29(.800)	Aug 04: 5TV, 1 ra FTA (India)
	KTN plus	3500/1650H	2+ TV	3/4	26(.667)	Indeto 2, apparently SE Asia based (08-04)
	TVK Cambodia	3448/1702H	1TV	1/2	6(.312)	**FTA**
	TARBS/Th5	3480/1670H	12 TV+radio	2/3	26(.667)	**3FTA**: TV5, VTV4, ATN Bangla
	KCTV/Korea	3424/1726H	1TV	3/4	3(.366)	Not 24 hour; FTA?
	Thai Global	3425/1725V	up to 7?	2/3	27(.500)	FTA (reaches SE Australia)
InSat 2E/83	**ETV mux**	4005/1145V	6+ TV	3/4	27(.000)	Several ETV now here; wide beam
	Hyd Dig 2E	3910/1240V	1	3/4	5(.000)	SCPC, OK E. Aust. wide beam
	Kairali TV	3699/1451V	1	3/4	3(.184)	SCPC, OK E. Aust wide beam
	Indian mux	3643/1507V	3	3/4	19(.531)	corrections 12/02
	ETV Mux#2	3485//1665V	4+TV	3/4	27(.000)	Several new ETV here; Asia beam
	Sky Bangla	3430/1720V	1TV	3/4	6(.000)	New - November 2002
NSS6/95E	**Ant Pac (Greek)**	11.104H-Australia	1 TV	3/4	2(.800)	(still) FTA 011-04; was 11.083H
As2/100.5E	**Guangdong TV**	4075/1075H	1TV + radio	3/4	6(.000)	July 04: FTA
	Euro Bouqt	4000/1150H	6TV, 2Ir	3/4	28(.125)	FTA TV + radio; TV5 Asie moved "down" April
	Reuters News	3905/1245H	1TV	3/4	4(.000)	Was 3923H; sometimes **FTA**
	WorldNet	3880/1270H	4+/28radio	1/2	20(.400)	FTA; multiple audio services V2360, A2320
	APTN Asia	3799/1351H	1	3/4	5(.632)	Sometimes **FTA**; also 3895Vt
	Reuters/Sing.	3775/1375H	1	3/4	5(.631)	**FTA** & CA
	APTN Asia#2	3705/1445H	1	3/4	4(.166)	**FTA** and CA - NASA reports included
	Macau MUX	4148/1002V	5TV	3/4	11(.850)	5 chs TV, FTA, some tests
	Feeds	4086/1064V	1	3/4	5(.632)	FTA SCPC feeds
	Dubai MUX	4020/11430V	4+, radio	3/4	27(.500)	FTA , EuroSport PID change (1213/1313) June
	Fashion TV	3796/1354V	1	3/4	2(.626)	FTA as of May 1, 2003
	Trace TV	3792/1358V	1	3/4	2(.400)	new here Dec 2004; Euro-French music videos
	3-ch miniMUX	3752/1398V	up to 3	3/4	5(.640)	Sun-TV, Surya TV, KTV (FTA)
	Saudi TV1	3660/1490V	7+/tests	3/4	27(.500)	FTA MCPC; Yemen, MBC EUROsport tests
As3S/105.5E	Telstra I-Net	12.596V	no TV	5/6	30(.000)	Signal useful for dish testing - no TV
	RR Mux	3669/1481V	up to 5 TV	3/4	13(.333)	Blue Kiss moved to 3760Hz from here Dec 2004
	Zee bouquet	3700/1450V	10TV	3/4	27(.500)	Now SECA 2 CA (10-04)
	Ch News Asia	3706/1444H	1TV (+)	3/4	6(.000)	New September 2003; English + V1160, A1120
	3 ch MUX	3723/1427V	3TV	3/4	6(.500)	Conax CA, 3 ch movie mux; Dec 2004
	SAB TV	3743/2407V	1TV	3/4	3(.300)	
	Arirang TV	3755/1395V	1	7/8	4(.418)	FTA SCPC; New PIDs V3601, A3606 June 2003
	Now TV +	3760/1390H	up to 10TV	7/8	26(.000)	CA + **FTA** + Blue Kiss adult (CA)
	Star TV	3780/1370V	7(+)TV	3/4	28(.100)	NDS CA (Pace DVS211, Zenith)
	GXTV	3806/1344V	1TV + 3 radio	3/4	4(.420)	Guangxi TV; was As2
	Shaanxi TV	3813/1337V	1TV + 2 radio	3/4	4(.420)	Was As2
	Anhui TV	3820/1330V	1TV + 2 radio	3/4	4(.420)	Was As2
	Jiangsu TV	3827/1330V	1TV + 2 radio	3/4	4(.420)	Was As2
	HLITV	3834/1316V	1TV	3/4	4(.420)	Was As2; HeiLong
	Star TV	3840/1310H	7(+) TV	7/8	26(.850)	NDS CA (Pace DVS211, Zenith)
	Star TV	3860/1290V	5(+)TV	3/4	27(500)	NDS CA (Pace DVS211, Zenith)
	AbuDhabi MUX	3880/1270H	8+TV, 10Radio	3/4	27(.500)	New April 2004: link to Optus B3 Globecast
	Dragon TV	3886/1264V	1 TV	3/4	4(.800)	Shanghai
	Shaandong	3895/1255V	1TV + 6 radio	3/4	6(.813)	Apparently Mongolia; was As2
	Jilin TV	3914/1236V	1TV + 1 radio	3/4	4(.420)	Was As2
	Star TV	3920/1230H	4+ TV	7/8	26(.850)	Star Sports Asia (+), **FTA** NTSC; V514, A670 (10-04)
	Star TV	3940/1210V	6(+)TV	7/8	26(.850)	NDS CA as above; may NOT be operational
	CNNJ	3960/1190H	8(+)TV	3/4	27(500)	PowVu CA; new SR Apr 29; CNN radio **FTA**
	StarTV	3980/1170V	6+TV	3/4	28(.100)	NDS CA; Star News India **FTA** VPID 514, APID 648
	Star TV	4000/1150H	8(+)TV	7/8	26(.850)	NDS CA w/ **4(Chinese) FTA**
	Sahara digital	4020/1130V	8TV	3/4	27(.250)	New Sr September
	Hubei TV	4035/1115H	1TV + 2 radio	3/4	4(.420)	Was As2
	Tianjin TV	4046/1104V	1TV + radio	3/4	5(.950)	new December 2005
	Sichuan TV	4051/1099H	1TV + 1 radio	3/4	4(.420)	Was As2
	Qinghai TV	4067/1083H	1TV + 2 radio	3/4	4(.420)	Was As2
	Hunan TV	4082/1068H	1TV + 1 radio	3/4	4(.420)	Was As2
	Pakistani TV	4091/1059V	5TV, 1 radio	3/4	13(.333)	new Sr, channels, Nov 2003
	Sun TV	4095/1055H	1	3/4	5(.554)	"History Channel" - SCPC
	TVB8 Mux	4110/1040H	3	3/4	13(.650)	**MATV Chinese movies FTA** +CA; new Sr 05-04
	Indus News	4115/1035V	1	3/4	3(222)	Hindi (+ "Plus")
	CCTV bqt	4129/1021H	4(+) TV	3/4	13(.240)	moved from 4115
	Zee Bqt #2	4140/1010V	8(+) TV	3/4	27(.500)	Now SECA 2 CA (10-04); 1 occ. FTA (varies)
	Henan TV	4166/984V	1TV + 4 radio	3/4	4(.420)	Was As2
	Fujian TV	4180/970V	1TV + 2 radio	3/4	4(.420)	Was As2
	Jiangxi TV	4187/963V	1TV + 2 radio	3/4	4(.420)	Was As2
	Liaoning TV	4194/956V	1TV + 2 radio	3/4	4(.420)	Was As2
Cak1/107.5	Indovision (S-band)	2.535, 2.565, 2.595, 2.625, 2.655	33(+) TV	7/8	20(.000)	NDS CA using RCA/Thomson, Pace IRDs; **2.535 has 2 FTA**
T'Kom/108E	**IndoBqt**	3460/1690H	up to 6	3/4	28(.000)	also 3586H/17.500, 3496H/19.615
C2M/113E	**TPI**	4185/965V	1	3/4	6(.700)	FTA SCPA; NT/NC only
	TVE Asia-Africa	4160/990H	1	3/4	5(.632)	New August 2003
	Anteve	4144/1006V	1	3/4	6(.510)	change from 4055V; FTA SCPC
	Kabelvision Mux	4080/1070H	7+ TV	7/8	28(.125)	also try 3500H, 27.000, 3/4; strong NZ
	Indostar	4074/1076V	1	3/4	6(.500)	**FTA** (new 06-03); V2201, A2202
	Satelindo	3935/1215H	1	3/4	6(.700)	test card - only - reported
	Bali TV	3926/1224H	1	3/4	4(.208)	**FTA**. may not be active full time

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Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
	Brunei/Sing	3733/1417H	1TV	3/4	6(.000)
	SCTV	3726/1424V	1TV	3/4	6(.620)
	RCTI	3473/1677H	2	3/4	8(.000)
As4/122E	Aust DTH test	12.453V	2	3/4	20(.000)
	CCTV internal	4020/1130V	6	3/4	27(.500)
	CCTV internal	4100/1050V	6	3/4	27(.500)
Jc3/128	Miracle Net	3996/1154V	3 up to 6	5/6	22(.000)
	Asian bqt	3960/1190V	up to 8	7/8	30(.000)
T18/138	**Tests**	3460/1690V	1	3/4	30(.000)
Jc2A 154	**BYU-TV**	3915/1245V	1+languages	3/4	4(.166)
MeasSs2	**Astro Mux**	11.602H	up to 17TV	3/4	41(.500)
	VTV MUX	11.522V	3 TV	3/4	9(766)
B3/152	AuroraBiz	12.407V	4 TV, 10 radio	2/3	30(.000)
	Occ feeds	12.445H	1TV	3/4	6(.666)
	Globecast 2	12.525V	13 TV, 8 radio	2/3	30(.000)
	Globecast (feeds)	12.550-.555V	1TV	¾ & 2/3	6(.110/.670)
	UBI/tests	12.613H/T14L	11+TV	3/4	22(.500)
	UBI/tests	12.649H/T14U	11+TV	3/4	22(.500)
	Globecast 1	12.658V/T7	14TV, 15 radio	2/3	30(.000)
	UBI/tests	12.674H/T15L	11+TV	3/4	22(.500)
	UBI/tests	12.701H/T15U	11+TV	3/4	22(.500)
	WA ABC	12.702V	1 TV, 1 radio	7/8	14(.288)
	WA SBS	12.720V	4TV, 2 radio	5/6	12(.600)
	WA GWN/WIN	12.738V	2TV	7/8	14(.295)
C1/156E	Optus test bed	12.288V/T1L	6+ (ABC) TV	1/2	28(.650)
	Aurora	12.324V/T1U	4+ (ABC) TV	1/2	24(.450)
	Pay TV	12.365V/T2	11TV, 2 radio	3/4	27(.800)
	Aurora Home	12.407V/T3	5 TV, 13 radio	2/3	30(.000)
	Pay-TV	12.447V/T4	5TV, 4 data	3/4	27(.800)
	Pay TV (test)	12.487V/T5	3+ TV, data	3/4	27(.800)
	Aurora 2	12.527V/T6	7TV, 20 radio	3/4	30(.000)
	Pay-TV	12.567V/T7	10 TV	3/4	27(.800)
	Pay-TV	12.607V/T8	10 TV	3/4	27(.800)
	Pay-TV	12.647V/T9	10 TV	3/4	27(.800)
	Austar	12.305H/T11	6TV, 24 data	3/4	30(.000)
	Pay-TV	12.358H/T12	10 TV	3/4	27(.800)
	Pay-TV	12.398H/T13	10 TV	3/4	27(.800)
	Pay-TV	12.438H/T14	6TV, 3 data	3/4	27(.800)
	Pay-TV	12.478H/T15	10 TV	3/4	27(.800)
	Pay-TV	12.518H/T16	10 TV	3/4	27(.800)
	Pay-TV	12.558H/T17	10 TV	3/4	27(.800)
	Pay TV	12.598H/T18	TV	3/4	27(.800)
	Pay-TV	12.638H/T19	10TV, 30 radio	3/4	27(.800)
	Pay TV	12.688H/T20	11TV	3/4	27(.800)
B1/160	Tasmania DTV	12.354H	1TV	3/4	5(.100)
	Occ. feeeds	12.380H	1 TV - *	3/4	6(.111)
	Occ. feeds	12.384V	1 TV - *	3/4	6(.111)
	Net 7 service	12.397H	1	3/4	7(.200)
	Imparja mx	12.379H	2TV + 8 radio	3/4	5(.424)
	7 digital feeds	12.397H	1TV	3/4	7(.200)
	Feeds to NZ	12.411V	1 TV	3/4	6(.111)
	SBS Mux	12.420H	3+ TV, 2+ radio	5/6	12(.600)
	TVNZ DTH	12.456V	5+TV	3/4	22(.500)
	Sky NZ	12.519/546V	7TV/7TV	3/4	22(.500)
	Sky NZ	12.581/608V	6TV/6TV	3/4	22(.500)
	Sky NZ	12.644/671V	9TV	3/4	22(.500)
	ABC HDTV	12.610H	5TV	7/8	14(.3288
	Sky NZ	12.707/734V	8+TV	3/4	22(.500)
	Mix 106.3	12.574H	1 radio + data	3/4	1(.851)
P8/166E	**ABS-CBN**	12.575H	4+TV, 4+ radio	2/3	13(.845)
	JEDI/TVB	12.686H	11+ TV	3/4	28(.126)
	ABC A-P	4180/970H	2TV, 2 radio	3/4	27(.500)
	Disney Pac	4140/1010H	typ 6 TV	5/6	28(.125)
	Taiwanese MUX	4080/1070H	12+ TV	5/6	30(.000)
	NHK Joho	4060/1090H	7TV, 1 radio	3/4	26(.470)
	FOX Mux	4040/1110V	up to 5TV	7/8	26(.470)
	NET+	4121/1029V	1 TV	3/4	4(.774)
	ESPN USA	4020/1130H	8+TV, data	3/4	26(.470)
	Discovery	3980/1170H	8 typ.	3/4	27(.690)
	CalBqt/Pas8	3940/1210H	up to 3+ FTA	7/8	27(.690)
	CNBC HK	3900/1250H	up to 7TV	3/4	27(.500)
	FilipinoMUX	3880/1270V	up to 8TV+radio	5/6	28(.694)
	TaiwanBqt	3860/1290H	12TV + 30 r	5/6	28(.000)
	CCTV Mux	3829/1321H	up to 4 + 1 radio	3/4	13(.240)
	TVBS-N	3836/1314V	**1FTA**, 4+ CA	3/4	22(.000)
	EMTV PNG	3808/1342V	1 + 2 radio	3/4	5(.632)
	CNNI	3780/1370H	3, up to 5 TV	3/4	25(.000)
	Discovery Asia	3764/1386V	Up to 6 TV	3/4	19(.850)
	MTV	3740/1410H	8	2/3	27(.500)
P2/169E	WA Mux Pv	12.281V	3+ TV, radio	2/3	27(.500)
	Ariang TV	12.401V	1TV	3/4	4(.400)
	ABS-CBN	12.575H	4TV, 2 radio		13(.845)
	NBN	4126/1024V	1TV	3/4	3(.075)
	TARBS feeds	4090V/1060V	9TV + radio	3/4	21(.000)
	BBC SCPC	3986/1164H	1TV	1/2	5(.700)
	Middle East	3836/1314V	4 typ	3/4	13(.331)
	Feeds	3803/1347V	1	3/4	6(.000)
(OFF???)	PAS/BBC mux	3744/1406V	3	3/4	21(.500)

Receivers and Errata
FTA ; Singapore 23hrs, Brunei 1 hr;Brunei V1200
was on 4048V; New Caledonia, parts of Australia
FTA SCPC; Australia, New Caledonia, some English
Planned Aust DTH; VTV CA, other FTA (10-04)
New Aug '04; Irdeto 2
New Aug '04; Irdeto 2 + **TVSN occ. FTA**
PowerVu; some FTA (Ch. 1 & 3)
CA & **FTA** NTSC: Japan, Taiwan
also try 3660Vt, Sr 30.000, 3/4
Erratic service; strong NZ & Australia
Aust East beam - **3 FTA** + 14 CA
WA only? Skew path, intended Asia
differs from 12.407 C1; **tune ch FTA; NZ+Au**
Net 10, V8 racing; also 12.452H, same parameters
NZ + Au, FTA _ Mcrypt CA
occ feeds, NZ + Au; recently 12.553V
High performance beam; not NZ
High performance beam; not NZ
NZ + Au (Mcrypt, PowVu capable)
High performancebeam; not NZ
High performance beam; not NZ
ABC WA tests, FTA
SBS, radio tests WA FTA
Irdeto V2 CA, tests (GWN, WIN)
Widescreen ABC service feeds x 6 + tests; 29 radio
Replaced Aurora T10 1 February 2005; 19 radio
Tests; SBS-NDS CA, others FTA when here
NZ (90cm) + Australia **(Only svc left on NZ; C1)**
Australia NA only (leakage to Norfolk, New Cal)
Australia NA only (leakage); 9-Net x 3 widescreen
Arrow radio, tone FTA
Pay-per-view movies; CA
Pay-per-view movies; CA
Pay-per-view movies; CA
Austar inter; Expo FTA
NDS CA + Mcrypt; CA
CA, subscriptions available Australia, Norfolk
Sky News active; "Help" FTA
CA, subscriptions avail Au, Nrflk; **TVSN FTA**
CA, subscriptions available Australia, Norfolk
"Home"CA, subscription available Australia, Nrflk
CA, subscriptions avail Australia, Norfolk
CA, subscription available Australia, Norfolk
CA, subscription available Australia, Norfolk
Central beam; also Central 7 at times
* - plus 12.451H, 12.460H
* - plus 12.293V, 12.402V, 12.411V
Full schedule less commercials - links; may be CA
PIDs vary; also try 12.360, 12.370
occ. digital feeds; typ fta
Often NTSC; USA-Australia-NZ
Also 12.437H same params; SBS HDTV + w-s
FTA 4 channels (TVNZ x 4); +Maori here
NDS CA, subscription available NZ
NDS CA, subscription available NZ
NDS CA, subscription available NZ
also see 12.626,.643,.670, .688, & .706H
NDS CA, subscriptions available NZ
Radio SCPC is "cover" for high speed data
FTA, plans CA "soon"
June 2002-Irdeto-2 CA
Dateline west; also east PAS2, 3901V
PowVu CA
Tests - CA service announced
PowVu CA & **FTA**; subscription available
was PAS-2, previously 3992Vt; **feeds FTA**
NET25 + FTA; new PIDS April '03; reload
PowVu CA; ch 11 DCP-CCP bootload; audio **FTA**
PowVu/CA (some audio **FTA**)
PowVu CA & **FTA (EWTN + CBS +TBN +)**
NDS CA (6 channels); one test card occ FTA
Myx FTA V1960, A1920 + radio FTA
Mixed **FTA** & CA; STC gone (CA)
PowVu FTA, replaces PAS-2 svc
Difficult because of CCTV cross pole
PowVu CA
PowerVu; some audio **FTA**
PowerVu; Asian MUX; new parameters Nov '03
8 **MTV China FTA V289, A290;** rest CA
PowVu CA, WIN, ABC NT, SBS; status unknown
Test - may not stay permanently
Temp **FTA**; will be CA, subs 011-800-2270-0722
May not be permanent; not available to NZ
Occ **FTA** (Chile +); BIG power reduction Nov 03
BBC World moved here January 2005
Irdeto 2 CA - subscriptions avail; Strong Tech
PowVu (FTA) occ sport feeds inc. Japan BB
BBC, test card FTA, others nominally CA

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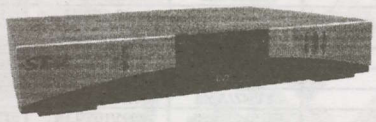

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Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
(PAS2/169E)	**Adventists.tv**	4040/1010H	1	2/3	5(.900)
	Feeds	3868/1182H	1	2/3	6(.620)
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(.620)/7(.498)
	Cal PowVu	3901/1249H	up to 8	3/4	30(.800)
	HK bouquet	3850/1300H	up to 8	2/3	24(.900)
	Korean Bqt	3771/1379H	1	3/4	6(.510)
I804/174E	**iPSTAR**	12.619H	1	2/3	25(.220)
	Tests-NZ beam	12.646H	1	3/4	22(.418)
	RFO Poly	4027/1123R	1TV	3/4	4(.566)
I701/180E	TNTV	11.060&11.514V	9	3/4	30(.000)
	TVRFO	11.136V, 11.174V	6+TV, 3+ radio	3/4	23(.149)
	Canal+Sat	11.610H	16TV, 1 radio	3/4	30(.000)
	PBS	12.648HH	16TV possible	3/4	28(.066)
	TVNZ/BBC	4186/964RHC	1	3/4	5(.632)
	TVNZ	4178/972RHC	1	3/4	5(.632)
	AFRTS DTS	4175/975L	3 TV, 3 radio	2/3	3(.680)
	TVNZ/Aptn	4170/980RHC	1	3/4	5(.632)
	Fiji Sky Pacific	4095/1055LHC	6TV + future radio	3/4	16(.505)
	Fiji Sky Pacific	4055/1095LHC	6TV + future radio	3/4	16(.505)
	TVNZ/feeds	4052/1098RHC	1	3/4	5(.632)
	TVNZ feeds	4044/1106R	1	3/4	5(.632)
	NZ Prime TV	4024/1126L	1	2/3	6(.876)
	NBC to 7 Oz	3960/1190R	1	7/8	6(.447)
	WorldNet	3886/1264R	1TV, 37 radio	3/4	25(.000)
	Iearana	3772/1378L	1	3/4	4(.566)
TEMP OFF AIR	**NASA TV**	3854/1296R	1 TV	3/4	2(.000)
	TVNZ	3846/1304R	1	3/4	5(.632)
	NBA (Barker) Ch	3803/1347R	1	3/4	6(.111)
TEMP OFF AIR	10 Australia	37691381R	4	7/8	20(.000)
	USA feeds	3749/1401R	4?	?	26(.400)
NSS-5/177W	Pacific IP Data	3745/1405R	none-date	3/4	44(.995)
	iPSTAR Tests	12.691V	9+ TV	5/6	17(.600)

Receivers and Errata
New December 2003; 24/7 "Hope Chs."
FTA (occ sport); also try 3863,Sr6.100
FTA-typ NTSC-occ sport, live Shuttle
PowVu CA + **FTA** (ABC-A-P 'til 'early' 2005)
was 4148Vt; some **FTA**
Korean MUX, reload 12-04; new Sr
Tests, late May start; also 12.646H
Testing possible data links; June 2003
SE spot beam; was 4027LHC
east spot; 10TV + r each, vertical pol.
FTA 11.136 Tahitian beam, 11.174 west beam; 12/04
1+ **FTA**, MediaGd "2"; + 10.975 weaker
Testing Fiji region pay-TV (MDS) package (Oct '04)
DMV/NTL early vers. occ feeds, typ ca
DMV/NTL early vers., occ feeds, typ ca
'DTS Direct to Sailors; audio previously FTA - gone
DMV/NTL early vers. occ feeds, typically ca
Nagravision CA (> Feb 1, 2005) New PIDS
Fiji-1 FTA; rest Nagravision CA (> 1 Feb, 2005)
DMV/NTL early vers.,occ feeds, typ ca
SCPC, mixed CA and **FTA** feeds
PowVu CA; Auckland net feeds
CA, Leitch encoded
New PIDs Dec 03 very strong NZ, Pacific
FTA SCPC; East Hemi Beam-Tahiti
24/7 live NASA - West Hemi beam (difficult!)
SCPC, mixed CA & **FTA**, feeds
NBA feeds - probably CA - new Nov 2003
PowVu CA & **TBN-JCTV FTA**
16-QAM (not MPEG-2 compatible)
Data only but useful for dish alignment, top Sr check
FTA Tests - Taiwan TV; data coming?? (NZ beam)

MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. AV-COMM P/L, 61-2-9939-4377.
AV-COMM Tiny Tot. FTA, 12Vdc operated, palm sized, low power consumption; review SF#120. Contact # above.
AV-COMM R3100(A). FTA, good sensitivity, ease of use exc (review SF May 2002). See above contact.
Coship 3188C. Review SF#107. Blind search FTA rcvr; works well. Available from Satlink NZ www.satlinknz.co.nz. **(ONLY KNOWN DISTRIBUTOR IN WORLD)**
Divitone: "Left-handed" review SF#115; does "code key" entry. Available http://www.satmax.ws
eMTech eM-100B (FTA), eM-200B (FTA + Cb2), eM210B (FTA + 2xCI + positioner); KanSat 61-7-5484 6246 (review SF#89)
Fortec Star Lifetime. Two versions, both blind search, code-key programmable, one X 2 CI. Review SF#119. www.aDigitaLife.com
Humax ICRI 5400 (Z). Embedded Irdeto + 2 CAM slots; initial units had NTSC glitch, now fixed. Widely available; new software avail 04-04, SF#76.
Humax IRCI 5410 (Z). Adaptable version capable of holding multi-CA systems (SF#98, 99). Widely available; original importer Sciteq (www.sciteq.com.au).
Hyundai-TV/COM. HSS100B/G (Pacific), HSS-100C (China) FTA. Different software versions; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also good; later 5.0 not good. SATECH (V2.26)
Hyundai HSS700. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8902.
Hyundai HSS800CI. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.
INNOVIA IDS3088. Review SF#111. Blind search FTA receiver. High quality IRD; available Phoenix Technologies, and Satmax (http://www.satmax.ws).
ID Digital CI-24 Sensor. New August 2003; new lower noise tuner, extra sensitivity; CI Interface slot Irdeto 1 & 2; review SF#109. Sciteq 61-8-9409-6677.
MediaStar D7. FTA, preloaded w/ known services, exc. software (review SF July 1998). MediaStar Comm. 61-2-9618-5777
MediaStar D7.5. New (May 00) single chip FTA; review June 00 SF. MediaStar Comm. Int. 61-2-9618-5777
MediaStar D10. FTA and Irdeto embedded CA. VG receiver; see review SF#96, August 2002. Contacts immediately above.
MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738
Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. SF#95, p. 14.
Nokia 9200/9500. When equipped with proper software, does Aurora, originally did pay-TV services provided software has been "patched" with "Sandra" or similar program. See SF#95, p. 14, SF#96 p. 15. SatWorld 61-3-9773-9270 (www.satworld.com.au)
Pace DGT400/DVR500. Originally Galaxy (Now Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818). UECs replaced; Sept 18 (2003) "drop-dead" day; all were to have been "turned off" on that date (in fact, those with V1.13 CAMs may still be working; still does radio including CA, not TV).
Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version (see SF#115, p. 15).
Phoenix 111, 222. PowVu capable, NTSC, graphics, ease of use. (111 review SF#57). SATECH (below)- 222; terminated
Phoenix 333. FTA SCPC, MCPC, analogue + dish mover. Detailed SF review SF#51. SATECH 61-3-9553-3399.
Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCal ++687-43.81.56)
PowerVu (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA (NHK, CMT etc). For service only - call Scientific Atlanta 61-2-9452-3388. For revision model D9850, see Scientific Atlanta (below).
PowTek. Blind Search Chinese sourced, field tests rate it highly. Source jason@aDigitaLife.com
Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.
SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL. (Skyvision Australia 61-3-9888-7491, Telsat 64-6-356-2749); no longer available.)
SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - (Skyvision - see above); no longer available.
SATWORK ST3618. Blind search FTA receiver. Fast search, problems, especially in "memory-filing" system; review SF#111. Available DMSi at tim@dmsiusa.com.
SATWORK ST3688. Blind search, 3000+ ch memory, multi-format RF modulator; improved version 3618. Review SF#113; available DMSi (above).
Scientific Atlanta D9223, D9234, D9225; Orig. PowerVu, superceded Dec 2003 by D9850. Commercial receiver, available TVO 61-2-9281-4481, John Martin
Strong Technologies SRT2620. SCPC, MCPC FTA, exc sensitivity, ease use, programming. Review SF#91 (ph. below).
Strong SRT 4600. SCPC, MCPC, PowerVu; exc graphics, ease of use, review SF#64. Strong Technologies 61-3-8795-7990.
Strong 4800. SCPC, MCPC, embedded Irdeto+ CAM slots, does code-key with additional software, Aurora. Strong Technologies 61-3-8795-7990.
Strong 4800 II. SCPC, MCPC CAM slots x 2 for Aurora +, Zee, Canal +, code key with additional software. Strong Technologies (above); review SF#103.
Strong 4890. SCPC, MCPC, 30Gb PVR, 2 CAM slots, DiSEqC 1.0, 1.2 (review SF#84), does code key with additional software; Strong Technologies, # above.
UEC Atlas/Titan (1000). New July 2003, replacing DGT400 for Austar. No SCART, L-band loop; also available Rural Electronics 61-2-6361 3636.
UEC642. Designed for Aurora (Irdeto), approved by Optus; w/new software, C-band FTA; faulty P/S. Norsat 61-8-9451-8300.
UEC660. Upgraded UEC642, used by Sky Racing Aust., Foxtel,limited FTA. (Nationwide - 61-7-3252-2947); P/S problems.
UEC700/720. Single chip Irdeto built-in design for Foxtel; unfriendly for FTA. Power supply problems, seldom sold to consumers; propensity to fall off back of trucks.
Winersat DigiBox 200. C + Ku basic receiver but includes Teletext for NZ TVOne, 2 VBI. Satlink NZ, fax 64-9-814-9447; long term teletext problems (loses TT).
"X" Digital. When modified with "aftermarket" Internet softwre, does Aurora and other V-1 CA without card; review SF#119. Strong Technologies (61-3-8795-7990).

Accessories:

Aurora smart cards. MYCRYPT (Irdeto V2) cards now available (Jan 2005), Sciteq 61-8-9409-6677.
PowerVu Software Upgrade: PAS-8, 4020/1130Hz, Sr 26.470, 3/4; pgm ch 11 and follow instructions (do not leave early!)
PowerVu (Pacific) repair service: Cable & Sat Svcs. Darius West. 61-2-9792-1421 (Email darius@cases.net.au)

WITH THE OBSERVERS

AT PRESS DEADLINE

Fiji 1 TV returned to FTA condition February 6 midday; **may** require erasing all previous (then FTA) Fiji TV memory in IRD and reloading for new PIDs. Fiji's Nagravision supplier claiming "cards and boxes must be paired" (matched) but validity of claim yet unproved; important issue for out of Fiji installers.

AsiaSat 3S/105.5E: "Additional radio channels now functioning on several Chinese SCPC - such as 3914V, 3834V, 4166V." **(Andy)**

Intelsat 701/180E: "NASA TV (3854RHC) and Australia MUX including TBN (3769RHC) remain 'gone' as of early February following demise of I804 and moving of 174E users to every available open megahertz in I701 and NSS-5. NASA does not know when service may be restored - when something major happens (of NASA interest) try AsiaSat 2, 3705Hz, Sr 4.166 which is APTN feeds." **(C. Sutton**, NZ)

Optus B3/152E: "T5/12.525V, Assyriasat from Modesto/Ceres (California) went off 19 Jan but returned 28 January. A full screen graphic announcing 'iPTR Iranian Pacific Television - contact 02 9763 2525'. The Sigaram 2 movie channel has been FTA for days at a time. T15/upper's only radio service channel, TRTFM, has been quiet for weeks." **(IF**, Qld) "T14/upper 12.640H 'Ch. 42' has been showing New York based NTD TV (Mandarin for Chinese immigrants, there), normally Russian MOCKBA TV." **(AI)**

Optus C1/156E: "Some updates from SF#125's detailed 'Dissect' listing. T1/Upper 12.324V, Sr 24.450, 1/2 - data stream is carrying Irdeto V1 and Mcrypt and DVB2000 software glitches although UEC 642 with 'Ed Guz' downloaded software plays fine. The video quality is worse than prior T10 transponder because the data rate is now reduced to the range of 3.75 to 3.85(MBit/s; was 5.3). T2/12.367V, 27.800, 3/4 (pay TV) - Optus has added an ABC TV channel and 5 radio channels, all FTA at press-time: New TV ABC WA, V=1111, A=1112, T=1037 but TT not in use; new radio - 4) Classic FM (WA, A=522), 5) Radio Nat (WA, A=532), 6) ABC Regnl (WA, A=542), and 7) ABC Regnl (WA Goldfields, A=552). On Feb 2 'TVN' - horse racing - was also added to MUX (www.TVN.com.au); V=1101, A=1102, static 1 MBit/s data rate - test card?. T3/12.467V, Sr 30.000, 2/3 (Aurora) - On 30 January Optus returned BTV1 to PIDs to V=34, A=33, CA. Transponder 6/12.627V, Sr 30.000, 3/4 (Aurora) - on 24 January all channels were FTA for a period of time after which radio channel 'SBS R SA' and TV 'SBS SA' reverted to CA (FTA listed in SF#125). T10/12.720V stopped providing Aurora service midnight 1 February; data stream empty although RF carrier still there February 2 (moved to T1/upper). Tr16/12.518H, Sr 27.800, 3/4 (Foxtel's +2 hour transponder for WA) - 7 new TV channels added, one (#12) changed as follows: 12) TV1 + 2, 13) Cmdy2, 14) UKTV2, 15) Aren2, 16) Clas2, 17) FX8+2, 18) Life2 and 19) Hist2. TR19/12.638H, Sr 27.800, 3/4: What is running on channel labelled 'encoder 9'? Only an encrypted copy of Australian Christian channel (i.e. ACC on T2). Feb 2 new on T19/12.638H, Sr 27.800, 3/4: ACT or Aurora Community Television (V=1101, A=1102), appears to be outlet for TV programmers who can't find a home someplace else (www.auroratv.org)." **(AI**, NSW) (Editor's note: Web site here says it will be CA: "In early 2005 Aurora will commence broadcasting on Foxtel's digital network. Aurora will be available to all digital subscribers on the basic tier. This is a unique opportunity for Australian Not For Profits, Charities and Community Groups as well as short film and documentary makers to have their work aired nationally.")

It is built into IRD software. Announcement that is triggered when a service goes down for whatever reason (the programmer here is assuming it is 'atmospheric conditions' but it could be LNB failure or the dish having moved) is designed to give paying subscriber reassurance their "sky" has not fallen!

PanAmSat PAS2/169E: "Some confusion about BBC World which has been FTA 3744Vt (T1V) for years - rumours this transponder is ailing. If missing, check 3986Hz (T10), Sr 5.700, 1/2 V=1160, A=1120." **(Junior West)** "Side effects of I804 failure - here on 3901Hz California Bouquet, Sr 30.800, perhaps temporary for TBN, JCTV and (the) Church Channel - which moved from I701 3769." **(Barney)**

Soapbox: "UBI's battle over whether they or someone else has legal rebroadcast rights to various Serbian/Middle eastern services continues. I found a static screen announcement on Serbian BK TV' in their native language which obviously was a legal statement about TV PLUS (not UBI) having the rights

WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. Photos of yourself, your equipment or off-air photos taken from your TV screen are welcomed. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for March 15th issue: March 4th by mail or 5PM NZST March 5th if by fax to 64-9-406-1083 or Email skyking@clear.net.nz.

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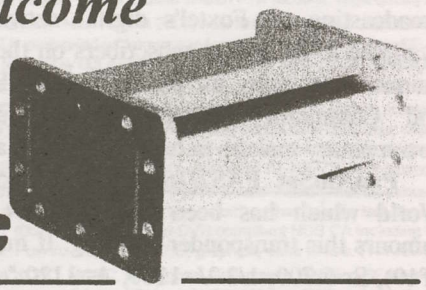

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to the channel. Does this make Boulos a 'TV pirate???'." (IF, Qld) "PanAmSat claims it is still owed US$30m after a court awarded them permission to assume the assets of TARBS. The satellite operator is in turn apparently assigning the subscriber lists, intellectual property and subscriber installed equipment (not owned by the subscriber) to World Media International (MySat) which is attempting to relaunch an Australia Arabic language pay-TV service using PAS-8." (**Dickie Do**, NSW) (Editor's note: Ex-TARBS boss Boulos has been in court on tax matters; the sudden ramp-up of Arabic channels through his new UBI [see list, here] undoubtedly has been fuelled by the MySat proposed service.)

Revisions - Dissecting B3 and C1 (SF#125)

If nothing else occupies the techs at Optus, moving around transponders and programming services appears to be a full time assignment. SatFACTS #125/January provided a detailed transponder by transponder listing as of Jan 5th operations; updates.

Optus B3/152E:

Transponder T7: Centre frequency 12.594(Vt); currently on NZ and National A shared beams.

11) GOD TV has replaced MAC TV FTA, V=501, A=540

Transponder T14/upper: 12.640(Hz), Sr 22.500, 3/4.

9) .20 BKTV crawl promotes "More exciting Balkan channels coming soon; 1300-400-800."

Transponder T15/lower: Centre frequency 12.674(Hz), Sr 22.500, 3/4. UBI has reshuffled TV channels as follows:

1) HEYA (Arabic), CA
2) INFY (Arabic, Infinity TV), CA
3) NEWT (Arabic, New TV), CA
4) NWER (Arabic, Al Mehwer), CA
5) ALYM (Arabic, Al Youm), CA
6) NDM (Arabic, Nile Drama), CA
7) NVAR (Arabic, Nile Variety), CA
8) ALSH (Arabic, Al Shasha), CA
9) CIN1 (Arabic, Cinema 1), CA
10) ROTC (Arabic, Rotana Cinema), CA
11) NNW (Arabic, Nile News) CA

Transponder T15/upper: Centre frequency 12.701(Hz), Sr 22.500, 3/4. UBI has again shuffled programming services as follows:

1) 12. ESC1 (Arabic, Egypt), CA
2) 13. TVS (Arabic, Syria Satellite), CA
3) 14. JSC (Arabic, Jordan Satellite), CA
4) 15. KTV (KurdistanTV), CA
5) 16. TLMZ (Arabic, Tele-Liban & Mazzika), CA
6) 17. ROTT (Arabic, Rotana Tarab), CA
7) 18. ROTM (Arabic, Rotana Music), CA
8) 19. SAT7 (Arabic), CA
9) 20. ALMJ (Arabic, Al Majd), CA
10) 21. STV (Turkish), CA
11) 22. TRTI (Turkish), FTA

"I am getting detectable signals in NSW from 88E Chinastar (CCTV1) and Yamal 201 at 90E although this is a circular satellite." (**D. Leach**) "Rupert Murdoch has established a new record - of sorts. Reportedly, he had paid US$58,000,000 for a 3 floor, 20 room, super-luxury apartment at New York City's trendiest address (834 Fifth Avenue). The apartment dates back to 1931 in its original form, designed and built for

the oil-wealthy Rockefeller family. Murdoch, 73 and counting, is ranked by US magazine Fortune as the 43rd 'Richest Person in the world.' There are several Rockefellers ahead of him on this list, something to aspire to." **(Irving Johnson**, Sydney) "With word that Fiji TV has paid A$2.1m for EMTV in PNG, there are other Pacific region services which could fall under the same tent this year. Western Samoa's government operated TV channel has been on and off the market and American Samoa will this year receive its' first 'live TV network' service, affiliated with the NBC USA net, courtesy of a local radio station. Several UHF channels have been granted 'construction permits' in Pago Pago, and

Optus C1/156E:

T1/lower: 12.288(Vt), Sr 28.650, 1/2. TV channels currently FTA and widescreen format, now have teletext PIDs (not in use February 2).

TV:

1) ABC (NSW), V=1011, A=1012, T=1016
2) ABC (Victoria), V=1021, A=1022, T=1026
3) ABC (same PIDs as #1)
4) ABC (Queensland), V=1041, A=1042, T=1046
5) ABC (SA), V=1051, A=1052, T=1056
6) ABC (NT), V=1061, A=1062, T=1066
7) ABC (same PIDs as #1)
9) ABC 2 (colour bar pattern), V=1081, A=1082

Radio (currently FTA):

1) JJJ, A=502
2) PNN (Parliamentary News Network), A=512
3) News Radio, A=522
4) dig (ABC Internet radio), A=532
5) DIG Jazz (no PID available)
6) DIG Country (no PID available)
7) Radio Australia (no PID available)
8) Radio Australia (no PID available)
9) ABC Radio (612, Brisbane), A=582
10) Classic FM (Qld), A=592
11) Radio Nat (Qld), A=602
12) ABC Regnl, A=612
13) ABC Regnl, A=622
14) ABC Radio (702, Sydney), A=632
15) Classic FM (NSW), A=642
16) Radio Nat (NSW), A=652
17) ABC Regnl, A=662
18) ABC Radio (774, Melbourne), A=672
19) Radio Nat (Vic), A=682
20) ABC Regnl, A=692
21) Classic FM (EPG says Vic but same as #15)
22) Classic FM, A=712
23) Radio Nat, A=722
24) ABC Regnl, A=732
25) ABC Regnl, A=742
26) ABC Radio (891, Adelaide), A=752
27) Classic FM (SA), A=762
28) Radio Nat (SA), A=772
29) ABC Regnl, A=782

they have been offered for as little as US$15,000 each. In theory, one of these owned by Fiji TV could act as a satellite fed relay from Suva and under US cable regulations the American Samoa cable system would be obliged to carry it; instant 10,000 home universe for Fiji TV. By carefully

playing Fiji-1's FTA service, relayed through ground based terrestrial transmitters, a number of 'markets' (including The Cooks) could be opened up for far less money than the sum paid for EMTV. Example: A ten watt VHF transmitter fed by satellite input is a (US) $5,000 system package including transmitting antenna and feedline, brand new off the shelf. Ten watts? Enough for line of sight (LOS) to ten miles or in the case of Pago Pago, to reach the cable headend!" (**Grant H, Pago Pago**)

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Fiji TV Update (February 4, 2005)
(Intelsat I701 at 180E)
Transponder "A"/4055LHC Sr 16.505, 3/4
Ch 1/Fiji One *FTA* (Rebroadcasts ABC A-P 16-18 hours daily, balance is locally processed); V512, A650
Ch 2/Sky Entertainment CA (includes some Hindi); V513, A660
Ch 3/Cartoon Net (Singapore feed) CA; V514, A670
Ch 4/MTV (SE Asia) CA; V515, A680
Ch 5/ABC A-P CA; V516, A690
Ch 6/CNN A-P CA; V517, A700

Transponder "B"/4095LHC, Sr 16.505, 3/4
Ch 7/Discovery NZ CA; V518, A710
Ch 8/TCM Aust/Super Channel CA; V519, A720
Ch 9/E! CA; V520, A730
Ch 10/ Bollywood (some Hindi) CA; V521, A740
Ch 11/ Premium/Trendz CA; V522, A750
Ch 12/ Pay per view/test card CA; V523, A760
CA is Nagravision 2, Fiji TV supplies IRD + authorised card although tests with other receivers using authorised cards underway. Hopefully, ultimately Fiji TV will be able to supply only the card through authorised out-of-Fiji installing service agents avoiding complex IRD delivery schemes in Pacific. To be an agent, Email tpatel@fijitv.com.fj. **Note**: At press-time (Feb 7) Fiji-1 temporarily CA.

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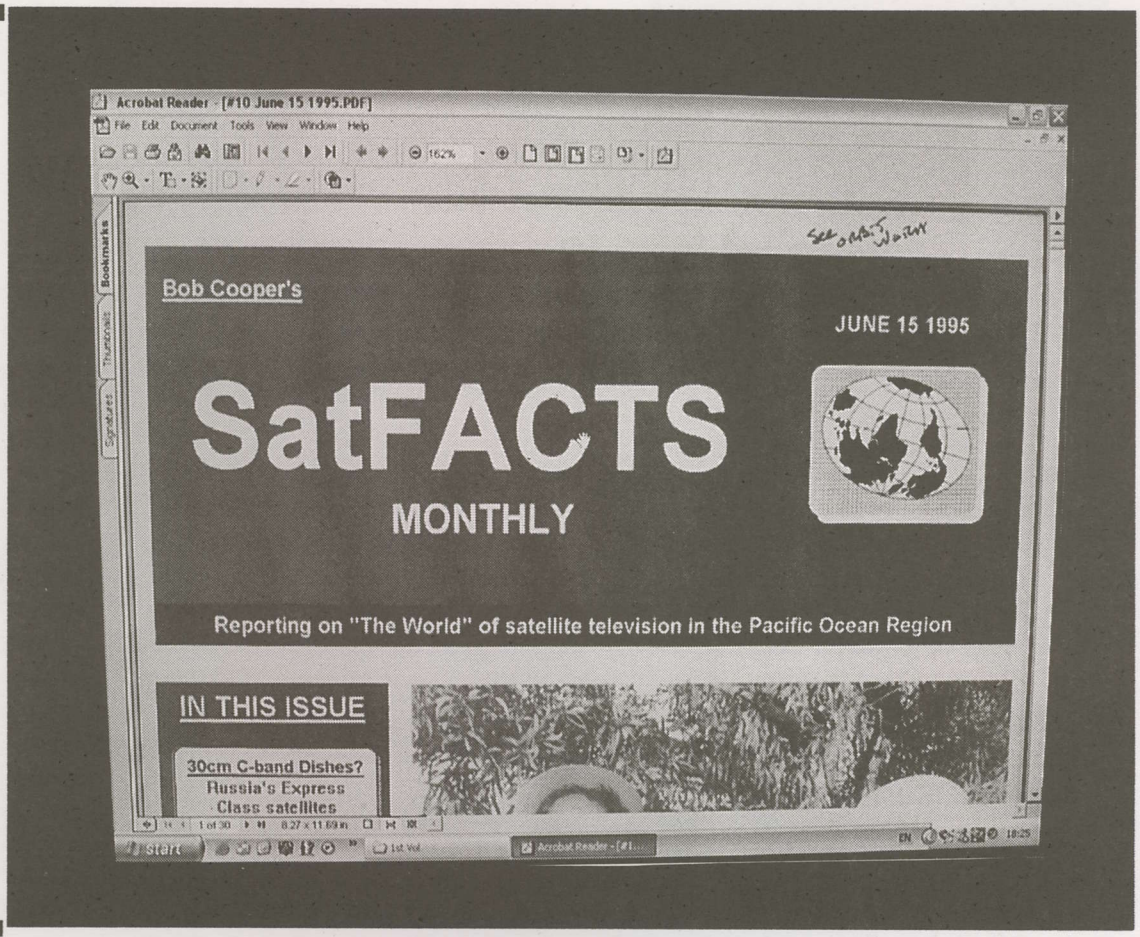

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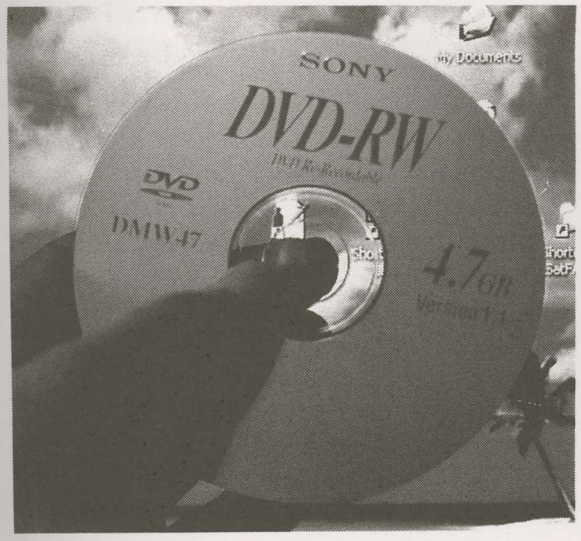
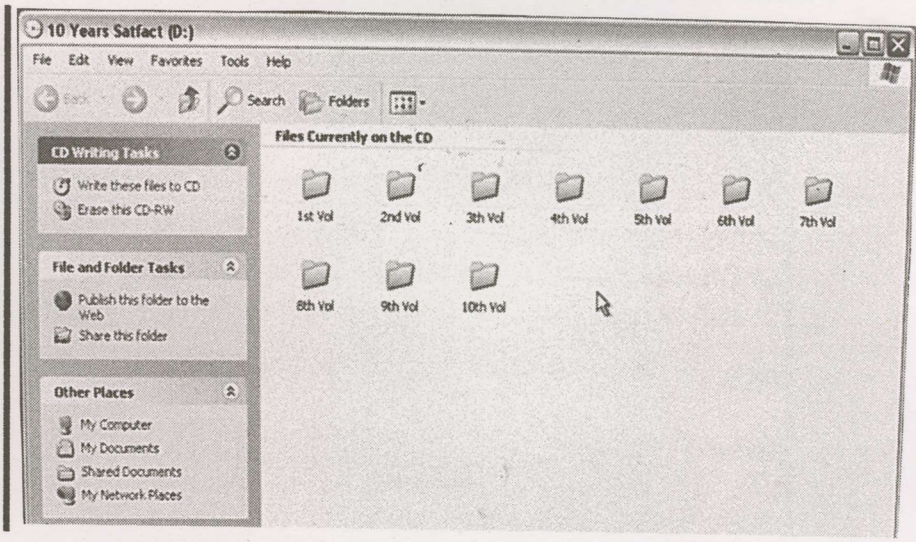
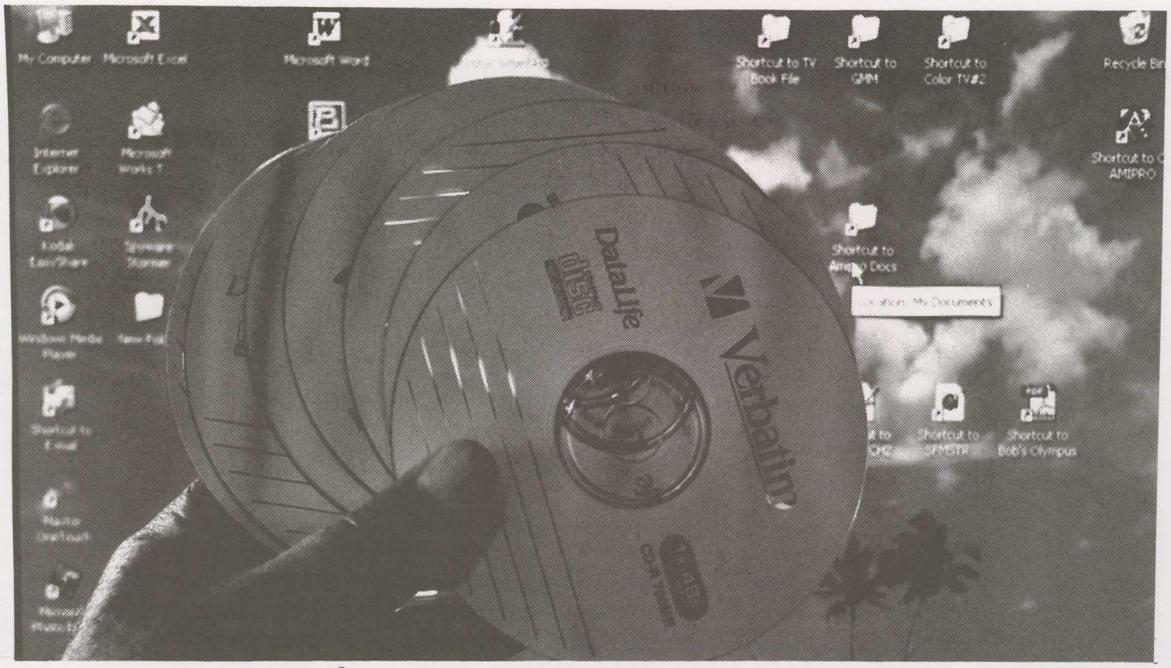




ON DVD - you will need Acrobat Reader (download from www.adobe.com; it is free); we have tested from earliest version 1.0 through recent versions 5.X. The DVD is actually a "super CD" using the 4.7Gb capacity of the DVD to store all ten years/120 issues on one disc. **Note:** This is in CD format - you cannot play this on a DVD player! AND - your PC must have DVD player built-in - this will NOT work on a CD-only PC player (for which - order CD set of ten for CD only - *see over*, please).

PRICE: NZ$/AUD$95 for all ten years, postage paid; outside NZ-Australia: US$95 postage paid.



OR-
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one volume (12 issues) per CD!

*** - Yes, we count only 7 here too!**

✓ Ten Years - 10 Discs
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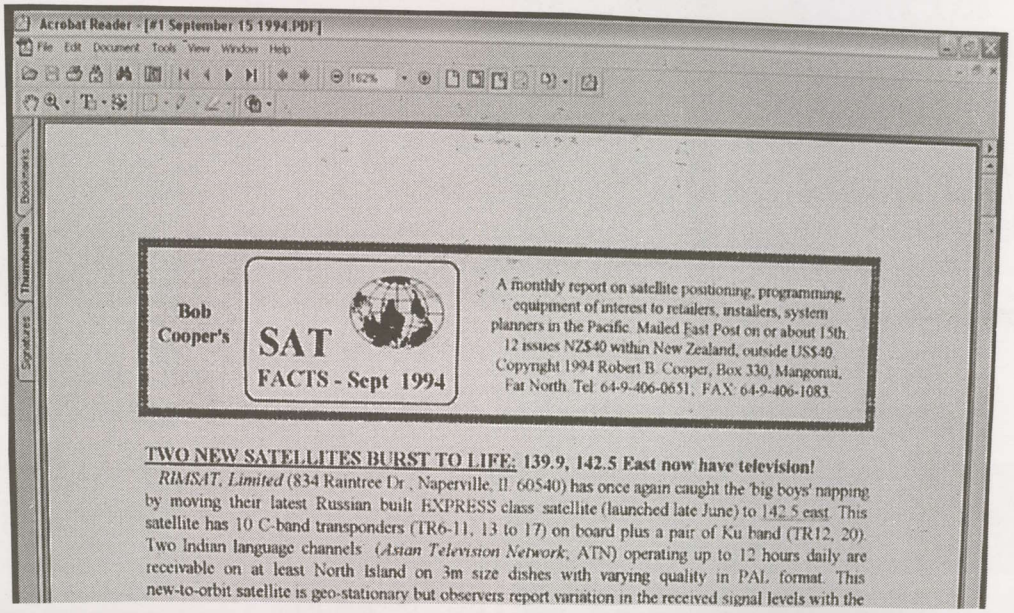
✓ PC must be equipped with Acrobat Reader (free at www.adobe.com)
✓ Files are NOT zipped or otherwise compromised
✓ Insert disc / enjoy!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Bob Cooper's SAT FACTS - Sept 1994

A monthly report on satellite positioning, programming, equipment of interest to retailers, installers, system planners in the Pacific. Mailed Fast Post on or about 15th. 12 issues NZ$40 within New Zealand, outside US$40. Copyright 1994 Robert B. Cooper, Box 330, Mangonui, Far North. Tel 64-9-406-0651, FAX 64-9-406-1083.

TWO NEW SATELLITES BURST TO LIFE: 139.9, 142.5 East now have television!

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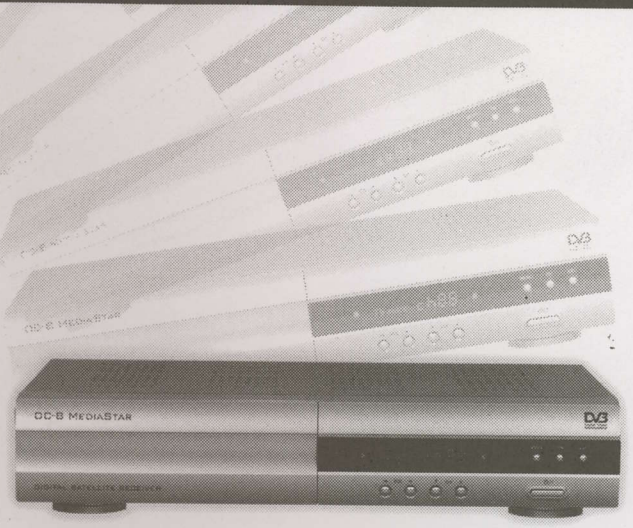

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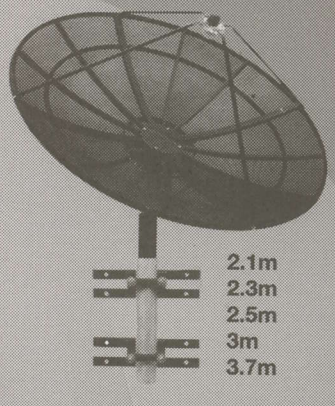

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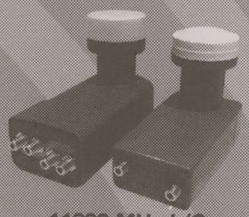

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